This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

NYPL RESEARCH LIBRARIES
3 3433 08231883 7

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

SAFETY ENGINEERING

PREVENTION OF NEEDLESS WASTE BY FIRES AND ACCIDENTS

VOLUME XXXII

JULY-DECEMBER, 1916

NEW YORK
THE SAFETY PRESS, Inc.
1916

Digitized by Google

THE NEW YORK
PUBLIC LIBRARY
773774
ASTOR, LENOX AND
TILDEN FOUNDATIONS
1907

Digitized by Google

Index to Volume XXXII

A

Accident causes in industry, relative importance, 266
Accident prevention, 42
  Dow, Marcus A., on, 345
  Education in, 224
  In the home, 161
  Literature, 248
  Maintaining interest, 374
  Richards, R. C., on, 342
  U. S. Steel Corporation's work, 43
  Value of activities, 29
Accidents
  Cement industry, 216
  Coke oven, 45
  Electrical, reducing, 253
  Failure to prevent industrial, 116
  Fresno, Cal., 202
  Home, 66
  Inventory of hazards, 127
  Minor and "near," 189
  Near, 281
  Pennsylvania increase, 67, 97
  Preventable, 112
  Problem as it concerns the general public, 296
  Public Service employes, 48
  Railroad stations, 149
  Railroads, 1
  Reporting, 103
  Studying causes, 230
  Texas labor commissioner on, 68
  Vehicles, 1
  Water, 2
  See also Railroads; Public service employes; Street traffic
Acid fumes, 275
Adamson, Robert, 23, 95
  Safety for public schools, 327
Aero Fire Alarm Co., 253
Alcohol, 259
  Safety vs., 355
Allen Mfg. Co., 383
"Almetl," 252, 320
Ambler Asbestos Century Shingles, 253
American Foundrymen's Association, 110
American Museum of Safety, 347
American Society of Safety Engineers, 166
  Outline of history, 123
Ammonia
  Explosion, Brooklyn, 31
  Explosion, St. George Hotel, Brooklyn, 144
Ammunition, hazards of manufacture, 75
Anaconda Copper Mining Co., 96, 189
Anderson, W. P., 63
Angell Elevator Lock Co., 251
Annal, John
  Real meaning of Safety First, 93
Anode, The, 96, 160
Aphorisms, 238
Armstrong, Alfred W., 48
Artillery cartridge cases, 81
Asphalt shingles, 203-206
  Tests and analyses, 204
Atwood, G. W.
  Police and fire, 352
Automatic sprinklers, protection in N. Y., 107
Automobiles
  Bus demolished, 132
  Increase in accidents, 304
Avery, G. L., portrait, 197
Ayres, J. H.
  Safety in Bessemer operations, 348

B

Bach, E.E.
  Welfare work, 337
Baird, B. G., 176
Bakeries, sanitary standard for, 56
Banks, Chas. T.
  Safety rules on the "Erie," 57
Barker, Harry, 131
Barrett Co., 255
Baskerville, Charles
  Occupational diseases in the chemical trades, 214
Bath tubs, 162
Bayes' Rule, 368
Beamer, F. M., 182
Belling the cat, 158
Benedict, V. L., 60
Bernstein Manufacturing Co., 127, 319
Bessemer operation, 348
"Big Four" R. R., 3
Bisbee, Ariz., mine rescue station (cut), 89
Black Tom explosion (with cuts), 69-74
  Wire glass at, 252
Blast furnaces, safe practice, 207
Bliss, H. E.
  Safety device for large transformers, 151
Boiler explosions, 253
Boiling, R., 376
Books on safety, 248-250
Boston, asphalt shingles, 203
Bowen, O. A., 121
Bowie, Geo. W.
  Epigrams and aphorisms on Safety First, 238-240
Bradford, Pa., letter, 281
Bragdon, G. D.
  Safety in Southern cotton mills, 335
Bridging (in building), 229
British phrase for "Safety first," 33
Brooklyn
  Refrigerating plant explosion, 31
  St. George Hotel, 144
"Brother's keeper," 117
Brown (L. L.) Paper Co., 251
Brownell, John R., portrait, 199
Browning, King & Co., 95
Bueno, J. R., de la Torre
  Goggle problem in chemical industry, 361
Bulletins, 371
  Live board, 61
Bureau of Fire Prevention. *See* Fire prevention
Burns and scalds, 162

C

Calendar of Pennsylvania R. R., 362
California, safety in mines, 297
Camera in safety work, 182
Cameron, W. H., 282
  Portrait, 194
  Report of progress of National Safety Council, 90
Campbell, Robt. W., portrait, 195
Candy factory safety, 232-236
Caps, shop, 251
Car cleaning, 48
Car screens, 130, 131
Careful men, 3
Carefulness, 20
Carelessness, 244
  Cartoon, 193
  Most serious fault, 97
Cars, safety decoration, 48
Casting chippers, 242
Cement floors, patching, 63, 382
Cement industry
  Accidents in 1915, 216
  Study of 1915 accidents, 299
Chairs, 161
Chamberlin, Corydon, 310

Digitized by Google

Chemical paper making, 27
Chemical trades, 242
  Goggles and, 361
  Occupational diseases in, 214
Chemicals, American made, dangers, 26
Chimneys and defective flues, 186
Chipping, 32
Clabaugh, G. W.
  Accident prevention in a large gas company, 286
Close, Chas. L.
  United States Steel Corporation's work in accident prevention, 43
Clothing
  Loose, 146
  Proper and improper, 8
Coal mines, central safety stations, 85
Coke oven accidents, 45
Cokeburg, 337
Combustibles, regulations for, 108
Compensation Inspection Rating Board of New York, 102
Concrete floors, patching, 63, 382
Consolidated Engine Stop Co., 255
Cook, Fred S., 232
Cooley, G. B.
  Railroad safety committees, 84
Cooper, Frank Irving, on safety in schoolhouses, 148
Co-operation, 243
  Fire-fighting, 59
  Prizes for, 118
Corbin Cabinet Lock Co., 255
Corn Products Refining Co., 108
Cortland, N. Y., 156
Cotton mills, safety in Southern, 335
Cowee, Geo. A., 63
Cowfer, A. B.
  Adequate safeguarding of elevators, 237
Crumbaker, W. H., 55, 122
Cutter, F. B., 63

D

Danger sign, a new, 281
Davis, P. L., 60
Day, B. Frank
  Safety from the economic viewpoint, 357
DeBlois, L. A.
  Fume poisoning, 275
Decalogue of Safety First, 113
De Rosset, Robt. C., Jr., 125
Detroit, 42, 226, 227
  See also National Safety Council
Detroit Fuse and Manufacturing Co. 191
Discipline, self, 97
Discussions, 242
Don'ts, gas, 153
Doors, metal, 382
Douglas, J. L.
  Accidents that could have been prevented, 112
Dow, Marcus A., 379
  Portrait, 196
  Railroad accident prevention, 345
Downey, E. H.
  Relative importance of accident causes in industry, 266
Draeger Oxygen Apparatus Co., 190
Drinking fountain, sanitary, 62
Dust, respirators for, 9, 11
Dynamite, regulations, 108

E

Eaton, J. M., portrait, 282.
Education, 241
  Accident prevention and, 224
  Cartoon, 193
  Public school, 271
Efficiency, 243
Eggan, M. J., 376
Eight-hour day, its relation to safety, 258
Elam, Frank H.
  Personal hazards, 5
Electric hazards, 366
Electric railways, safety movement, 289
Electrical accidents, reducing, 253
Electrical industries
  Problems, 219
  Safety work, 151
Electrical shock, resuscitation by pain, 111
Electrically controlled engine stops and speed limit governors, 16
Electricity in the home, 163
Elevators
  Adequate safeguarding, 237
  Angell Elevator Lock Co., 251
  Chatter, 305
  Doors, 62
  Elimination of hazards, 84
  Freight, 350
  Hydraulic and electric, 252
  Safety devices for plunger, 119
  Shur-Loc device, 254
Elliott, J. A. R., 382
Ellsworth, 337
Emery wheels, 32, 242
Employer, safety work on his part, 116
Employers' liability insurance, duties of statistician, 98
Employment, medical supervision and safety, 359
Employment departments, functions, 264
Engine stops, 255
  Electrically controlled, 16
Eno, W. P.
  Street traffic regulation, 341
Epigrams, 238
Erie R. R. safety rules, 57
Evans "Almetl" Fire Doors and Shutters, 252, 320
Explosions
  Ammonia, St. George Hotel, Brooklyn, 144
  Black Tom (with cuts), 69-74
  Boiler and fly-wheel, 253
  Refrigerating plant in Brooklyn, 31
Eye protection, 377
Eye protectors, 191

F

Factories in New York, power to order structural changes, 95
Fatigue, 259
Fay, Albert H.
  Coke oven accidents, 45
Ferguson, Donald V., 211
Ferro Concrete Construction Co., 63
"Fight Against Fire"
  Articles, 59, 185
  Comments, 60, 125, 312
  Offer, 59, 185
  Prizes won, 60, 125, 312
Fire alarm system, 253
Fire-alarms, interior, 107
Fire and Accident Prevention Day, Oct. 9, 176
Fire doors, 190
Fire escapes, factory, exterior, 185
Fire extinguishers, 251
  Fyr Fyter, 254
Fire hazard included in Safety First, 283
Fire hose
  Factory inspection service, 30
  Inspected, 380
Fire logic, little journeys in, 229
Fire prevention
  Booklet (Worthington's), 115
  Bureau of, New York, report of Chief, 104-109
  Conference of associations, Chicago, Oct. 6, 291
  Gas Dont's, 153
  Juvenile workers and, 212
  Literature, 249
  New book, 381
  Personal responsibility, 13
  Regulations published (N. Y.), 107
  San Francisco, 3
  See also "Fight Against Fire"
Fireproof construction, 252
Fire Underwriters. *See* National Board of Fire Underwriters
Fire walls, 187
Firemen, ideas of New York, 23
Fire Prevention Day, 321, 333
Fires.
  Gulf Refining Co., Port Arthur, Texas, 140
  Locomotive as a fighter, 15
  Police and, 352
  Uneeda Storage and Van Company's warehouse, 67
Fires in 1916, list of number of persons killed and injured, 322-326

Digitized by Google

Firing tools, 48
First aid equipment, 127, 254
Fisher, Arne, 368
Flashlights, 112
Floors
  Patching cement, 63, 382
  Troegerlith Tile Co., 254
Flywheel explosions, 253
Fooling, 160
Ford Co., 382
Fore River Shipbuilding Corporation, 168
Foremen.
  Part in the safety movement, 308
  Responsibility, 244
Forster, H. W.
  Accident prevention in the home, 161
  Fire prevention a personal responsibility, 18
Foundries
  Improved safety code, 110
  Safety in, 32
Freight elevators, 350
Fresno, Cal., 202
Fulminates, 81
Fumes, 192, 275
Fuse powder trains, 80
Fyr Fyter Co., 254

G

Garnet, Herbert, 192
Gas, fire prevention don'ts, 153
Gas and electrical industries
  Omaha Gas Co., accident prevention, 286
  Problems, 219
  Safety and efficiency in, 284
Gas industries, safety work, 151
Gasoline, 68
  Hazard, 14
  Tank fire, 140
Geier, Otto P.
  Human side of industry, 273
Giegerich, Justice, 95
Gilmour, George
  Address on the successful safety engineer, 133-139
"Ginger" in safety, 374
Gloves, 11, 154
  Rubber, 219-220
Goggles, 7, 11, 32, 109, 112, 146, 242, 371, 377
  At the front, 62
  Chemical industry, 361
  Exhibit, 383
  Insuring the wearing of, 227
  Willson, 253
Golden Anderson Valve Specialty Co., 253
Goodyear Tire and Rubber Co., 191
Governors, speed limit, electrically controlled, 16
Grade crossings (cartoon), 1
Griffin, Roger C., 205
Grinding wheel safeguards, 192
Grounding, 219
Guards
  Lockhart-Hodge, 254
  Presses, 255
Gulf Refining Co., gasoline tank fire, 140

H

Hague, Frank, 74
Hammitt, Joseph O.
  Report of Bureau of Fire Prevention, New York, 104-109
Hand rail and screen, 113
Handling tools, 48
Hansen, Carl M., 2
Hardy (F. A.) & Co., 251
Harmony, 373
Hart, E. H., 35
Hartford Fire Insurance Co., 190
Harvey, Julien H.
  Safety and efficiency in gas and electrical industries, 284
Hazardous trades, regulation, 107
Hazards
  Ammunition manufacture, 75
  Chemicals, 26
  Classification in experience rating, 368
  Electric, 366
  Electric pressing irons, 370
  Moral, 186
  Motion picture films, 108
  Personal, 5
  Shingle roof, 12
  Taking inventory of accident hazards, 127
Health
  Education, 363
  Steel mills, 145
Helmets, 8, 11
Hendrick, A. C.
  Statistician or rate-maker's duties, 98
Hicks, R. W., Jr., 2
  Elevator hazards, 34
Hill, Robt. B., 216
  Cement industry accidents in 1915, 299
Hoffman, Frederick L.
  Accident problem and the public, 296
Holes, 48
Holmes, J. T., 168
Home
  Accident prevention in, 161
  Accidents, 66
Hook, Chas. R.
  Safety in rolling mill operation, 277
Hose, *See* Fire hose.
Hourigan, J. P.
  Alcohol vs. Safety, 355
Human side of industry, 273
Huntington, W. Va., 319
Hutson, A. C., 381

I

Illinois Steel Co., 146, 164
Immel, Ralph W., 55, 122
Industrial accidents. *See* Accidents.
Industrial safety, 223
  Safeguards in campaigns, 226
Industrial Safety Conference, first New York, notice and program, 279
Industry, human side, 273
Inspection, enforcement of orders, 105
Inspector, 241, 246
  Broadening the, 180
Insurance statistician's duties, 98
"Is it safe?" 33
Ittner, Wm. B., 33

J

Jackson, Clarence E.
  Relation of the eight-hour day to safety, 258
Jackson, Commissioner (Pa.), 67
Jersey City
  Black Tom explosion, 72
  St. Peter's church altar (cut), 71
Jitney accidents, 130, 132
Johns-Manville Co., 383
Johnson, Chas. L., 121
Joking with death, 67
Journal of the Association of Foreign Language Newspapers, 66
Juvenile workers, fire prevention and, 212

K

Kansas, *See* Topeka
Kansas City, safety campaign, 220
Kansas City Railways Co., work, 284
Keasbey & Mattison Co., 253
Kennedy, Daniel J., 310
Kerber, Wm. C., 310
King, F. W.
  Insuring the wearing of goggles, 227
  Protection from molten metal, 109
Kingsley, D. P., 317
Knapp, A. Alden, 176
Kny-Scheerer Co., 254
Koenig, Fred
  A B C of Safety, 20
Kohler Industries, 167
Korner, John H., 310
Koven (L. O.) & Brother, 255
Krantz Mfg. Co., 253
Kuss, George J., 23

L

Ladders, 161
  Fall from, 154
Lanterns, oil, dangers, 92
Larson, Nils F., 127
La Salle, Ill., mine rescue station (cut), 88
Leather plant, 179
Leggings, 10, 12
Lehigh Valley R. R., Black Tom explosion, cuts and statement, 69, 70, 74

Digitized by Google

Letters to the editor, 281
Lewis Institute, Chicago, 5, 34
Library, safety, 383
Lincoln Highway, 26
Linemen's tool belt and safety strap, 46
Lister, Lord, and clean wounds, 147
Literature of safety, 248-250, 313-317
Little, Arthur D., 204
"Locked out" (cartoon), 3
Lockhart-Hodge guards, 254
Lockney, I. L., 121
Locomotives, railway, as a fire fighter, 15
Loebenstein, Julian, 111
London Omnibus Co., 33
Long, John F., 121
Louy, Matt, 182
Lucas, Thos. J., 60
Luden (Wm. H.) Co., 232
Luster, E. C., 182

M

McCoy, Adrian W., 182
McDowell, Mary
  Fire prevention and juvenile workers, 212
McKeehan, C. W., 60
MacMahon, T. J.
  Lord Lister and clean wounds, 147
Magazines, 373
"Man failure," 111
Man higher up, interesting, 177
Man on the job, unsafe conditions, 177
"Man on the Job" Department.
  Articles, 49, 116, 177, 241, 305, 371
  Comments, 55, 121, 182, 309, 375.
  Offer, 49, 116, 177, 241, 305, 371
  Prizes won, 55, 121, 182, 310, 376
Manning, Van H., 145
Manual training, 211
Martin, C. A.
  Wood room safety, 269
Masks, 8, 11
  Babbitting (with cut), 109
Matches, 14, 163
Mayer, Wm. C., 310
Medical service, 274
Medical supervision, 359
Merchant & Evans Co., 320, 382
Metal, protection from molten, 109
Metal goods manufacturing, schedule rating system, 101
Metal mine accidents, 339
Miley, Chas. T., 310
Milne, W. B.
  Fire hazards of ammunition manufacture, 75
Mine rescue, U. S. Bureau (cuts), 85-90
Mine rescue contest, California, 297
Mines
  California safety, 297
  Metal mine accidents, 339
  Welfare work, 337
  See also coal mines
Mirrors at corners or crossings, 26
Mississippi Wire Glass Co., 252
Molten Metal, 109
Moral hazard, 186
Morey, Arthur T., 282
  Portrait, 194
Morley, R. B.
  Safety education in the public schools, 271
Morrow, R. L.
  Chemical paper making, 27
Motion picture film hazards, 108
Motion picture theater safety, 351
Motorman, 154
Mueller (H.) Mfg. Co., 63
Multi-Metal Separating Screen Co., 252, 319
Munitions. *See* Ammunition.
Murrie, J. L., 219
Museum. *See* American Museum of Safety.

N

Nagle, J. J., 376
Nails, protruding, 48
National Board of Fire Underwriters on Black Tom explosion, 72
National Council for Industrial Safety, 41
National Electric Light Association, 46
National Highways Protective Association, report, 1
National Safety Council, 282
  Cartoon, 193
  Detroit Congress, notice, 155
  Exhibitors, list, commercial safety exhibit, 227
  Exposition of safety equipment at N. S. Congress, 41
  Facts showing growth, 208
  Field secretary, 65
  Foundry section bulletins, 82
  New features, 1
  Officers, Executive Committee, Director, 194-200
  Program of Detroit Congress, 169-176
  Safety exhibit, 318
  Sections, 200, 202
  Third report of progress, 90
Navigation, Safety First, 66
Near accidents, 281
New Jersey
  Accidents by vehicles, 1
  Rules for electrically controlled engine stops, etc., 16
New York (City)
  Accidents by vehicles, 1
  Adamson on safety for schools, 327
  Fire Department, Administration medal, 23
  Fire prevention orders not complied with, 321, 327
  Ideas of firemen, 23
  Local Council No. 14, 379
  Power to order structural changes in factory buildings, 95
  Safety commissioner, 351
  See also under Fire prevention
New York civil service positions, 280
New York Edison Co., 219
  Hand rail and screen, 113
New York Industrial Safety Conference, notice and program, 279
New York, New Haven & Hartford R. R., 1
New York State Railways, 48
Nitric acid poisoning, 275
Noonan, Victor T., 110
Norris, Henry H.
  Safety movement in electric railway work, 289
Norton Company, 192

O

Occupational diseases, chemical, 214
O'Hearn, Commissioner, 203
Oil lanterns. *See* Lanterns
Oily waste cans, 255
Oklahoma City water supply (with cartoons), 4
Oklahoman (cartoons), 4
Orth, G. A.
  Education in accident prevention, 224

P

Pacific Telephone and Telegraph Co., 46
Palmer, L. R., 282
  Portrait, 257
Paper, safety, 251
Paper making, chemical, 27
Patterson, Dr. Francis D., portrait, 198
Peelle Co., 62
Pennsylvania
  Industrial accident increase, 67, 97
  Safety conference, 298
  Workmen's Compensation Act and mine operators, 85
Pennsylvania Department of Labor and Industry, 211
  Approval of safety devices, 228
Pennsylvania R. R., new safety calendar, 362
Pennsylvania Wire Glass Co., 251
Personal hazards, 5
Personal responsibility, 13
Peters (James) & Son, 190
Petty, D. M.
  Electric hazards, 366
Phelps, L. A.
  Employment, medical supervision and safety, 359
Philip, Wm., 125
Piano industry safety work, 167
Pittsburgh *Leader*, 67
Pittsburgh *Post*, 3
Playing the game of Safety First, 309

Digitized by Google

Poisoning by acid fumes, 275
Poisons, 163
Police.
Co-operation, 106
Fires and, 352
Police commissioner, 351
Port Arthur, Texas. *See* Gulf Refining Co.
Portland Cement Association, 216
Pound, Roscoe, quoted, 90
Powder, storing, blending, etc., 82, 83
Practical Safety Methods and Devices, 63
Prehistoric man, 114
Presses, guards for, 255
Pressing irons, 370
Price, C. W., 203
Portrait, 195
Sketch and portrait, 65
Prichett, E. K., portrait, 199
Primer of Precaution, 236
Public safety work, 365
Public service companies, special problems, 111, 219
Public service employes, typical accidents, 48, 154
Public utilities companies, 46
Pullman, Major, 2
Pulmosan devices, 252
Pulmotors, 63, 190, 383
Pultney, D. C., 166
Pyrene Manufacturing Co., 62, 128, 251
Pyrobar Tile Roof Deck, 191

Q

Quebec Bridge, 131, 132

R

Railing, 146
Stair, 161
Railroad stations, accidents at, 149
Railroads
Accident prevention (Dow), 345
Accident prevention (Richards), 342
Accidents, 1
Erie rules, 57
Locomotive as fire fighter, 15
Pennsylvania tunnel accident, 129
Safety calendar, 362
Safety committees, 84
Unsafe practices in operating, 139
Walking on, 3
Ransom, F. W., 312
Rating. *See* Statistician
Red paint, 68
Reeder, Earl J., 310
Reflectors. *See* Mirrors
Refrigerating plant explosions, Brooklyn, 31, 144
Rehfield, Samuel H., 312
Reporting injuries, 103
Respirators, 9, 11, 192
Responsibility, personal, 13
Rhodes, Benj. D., 310
Rhodes, Wm. E., 310
Richards, R. C.
Accident prevention, 342
Richardson, A. S.
Minor and "near" accidents, 189
Riveting hammers
Dangers, 294
Robertson, J. A., portrait, 200
Robertson, L. B., portrait, 198
Rolling mills, safety in operation, 277
Roofs
Barrett Co., 255
Fire resistive, 253
Shingle, hazards, 12
Rotary converter, 112, 113
Rubber gloves, 219-220

S

Safe-Cabinet Co., 63
Safeguarding, principles of, 164
Safety.
Economic viewpoint, 357
Educating for, 50
From a new angle, 49
How to get 100 per cent, 52
Safety committee meetings, 262
Safety committees, selection of members, 260
Safety Congress
Banquet, Oct. 19 (ill.), 293
Fifth annual, notice, 194
Fifth meeting, importance, 282
1916, feature, 41
Safety devices, new, 252
Safety engineer
Duty, 223
Scrap books, 250
Successful, 138-139
Value, 223
War profits and, 223
See also American Society of Safety Engineers
Safety engineering profession, 155
Safety exhibit at Detroit convention, 318
Safety First.
A B C of, 20
Car decoration, 48
Decalogue of, 113
Epigrams and aphorisms on, 238-240
Home accidents, 66
Improved(?) phrase in London, 88
Includes fire hazard, 283
Making a joke of, 67, 68
Navigation (cartoon), 66
Novel machine, 176
Playing the game well, 309
Prehistoric man and, 114
Railroad committees, 84
Real meaning, 93
Woman's view, a, 96
Safety First Federation of America Convent plans, 317
Safety First Society of America, 130
Safety First Supply Co., 127, 319
Safety museum. *See* American Museum of Safe
Safety Or Sorrow, 168
Safety primer, 236
Safety work, effective, 180
St. George Hotel, Brooklyn, 144
St. Paul, Minn., manual training, 211
San Francisco, fire prevention regulations, 9
Schmid, E. C., 121
Schmidt, Martin M., 31
School buildings
Planning, 33
Safer, 148
Safety for (R. Adamson), 327
Schools, public, safety education, 271
Schreiber, Hermann V.
Studying the causes of accidents, 230
Schwessinger, George, 310
Score boards, 373
Scott, Robert
Locomotive as a fire fighter, 15
Scoville, E. R.
Selecting safety committees, 260
Scrap books, 250
Screens, street and elevated car, 130, 131
Screws, set, 383
Self preservation, 114
Shaft hangers, steel, 190
Sharon Plate Works, 156
Shepard, F. W.
Eye protection, 377
Shingles
Asbestos, 253
Asphalt question in Boston, 203-206
See also Roofs
Shock absorbers, 382
Shoes, 11, 12
Defective, 112
Shoudy, L. G.
Health education, 363
Shrapnel, 78, 79
Shur-Loc device, 254
Shutters, metal, 382
Signs, 59
Word to the wise, 305
Slack cable devices, 178
Sleeves, loose, 6
Slipping, 162
Smart, Mr., of Pa., 281
Smith, J. C., 182
Smoking on duty, 58
Sodium sulphide, 26
S O S, 168
Southern Pacific R. R. accident at Fresno, Ca. 202
Spectator Co., 381
Speed, 67

Digitized by Google

Speed limit governors, 16
Sperr, F. W.
Metal mine accidents and their prevention, 339
Spicer, John S., 310
Unsafe practices in operation of railroads, 139
Spreckels Sugar Co., 26
Spring, Edw. C.
Possibilities of public safety work, 365
Sprinklers. *See* Automatic sprinklers
Stairs, 161
Standard Pressed Steel Co., 191
Stanion, Thos., 376
Statistician's duties in employers' liability and compensation insurance, 98
Steel casting plant, 178
Steel equipment, 319
Steel mills, health conservation in, 145
Stone, J. P.
Dangers of riveting hammers, 294
Stools, 161
Storage warehouse fire, 67
Street traffic
Accidents in N. Y. car strike, 130-132
Crossing diagonally, 130
Regulation, 341
Strickland, W. P., 111, 182
Strikes and safety car screens (cuts), 130, 131
Suggestion boxes, 22
Sulphur black, 26
Supervision, need of, 120
Swinton, England, 156
Switches
Discharging and grounding (N. Y. Edison Co.), 219
Enclosed, 191

T

Tanks
Chemical, 242
Construction in England and America, 156
See also Gasoline
Thinking, 97
Deficient, 7
Need of, 51
Thoughtlessness, 244
Tinners, timely hints for, 211
Tools
Firing; handling, 48
In the home, 162
Topeka, Kan.
Safety First machine, 176
Safety Museum, 126
Track-jack, 48
Transformers, safety device for large, 151
Tree trimming, 154
Troegerlith Tile Co., 254
Trouser guards, 112
Trumbull, J. G., 190

U

Underwriters' Laboratories
Fire hose inspection, 30
Recent approvals and renewals, 64, 128, 192, 256, 320, 384
Uneeda Storage and Van Company, 67
United States Bureau of Mines, rescue stations, etc. (with cuts), 85-90
United States Steel Corporation, accident prevention work, 43
Universal Safety Co., 127
Universal safety standards, 2

V

Vehicle accidents, 1
Verner, J., 312

W

Walls, fire, 187
Washington, D. C., water accidents, 2
Waste cans, 255
Water accidents, 2
Water supply, Oklahoma City (and other cities), 4
Watkins, J. A., 145
Way, S. B., 236
Welfare work (mines), 337
Wentworth, Franklin H., 14
Western Glass Co., 255
Willcox, Frederick H.
Safe practice at blast furnaces, 207
Williams, Arthur, portrait, 196
Willson, T. A., & Co., 62, 253, 383
Wilson, H. M.
Central safety stations in coal mines, 85
Portrait, 197
Wilson, W. C.
Making safety committee meetings interesting, 262
Winkler, Jacob, 312
Wire glass, 251, 252, 255
Wire workers, 20
Wisconsin Gas & Electric Co., 236
Wisconsin Industrial Commission, 65
Wisconsin State Journal, 66
Wood room safety, 269
Woodman, C. W., 68
Woods, Arthur, 351
Workman, educating, 50
Workmen's compensation insurance, duties of statistician, 98
Workmen's Compensation Service Bureau, 2
Worthington, Chas. E.
Bridging, 229
Fire prevention booklet, 115
Who will bell the cat? 158
Wounds, clean, 147
Wrenches, accidents from, 154
Wright, J. H.
Freight elevators, 350

Y

Young, A. H., 347
Functions of a modern employment department, 264
Portrait, 347
Young, Robt. D., 310
Young, Robt. J.
Principles of safeguarding, 164

Digitized by Google

THE NEW YORK
PUBLIC LIBRARY
773774
ASTOR, LENOX AND
TILDEN FOUNDATIONS
1917

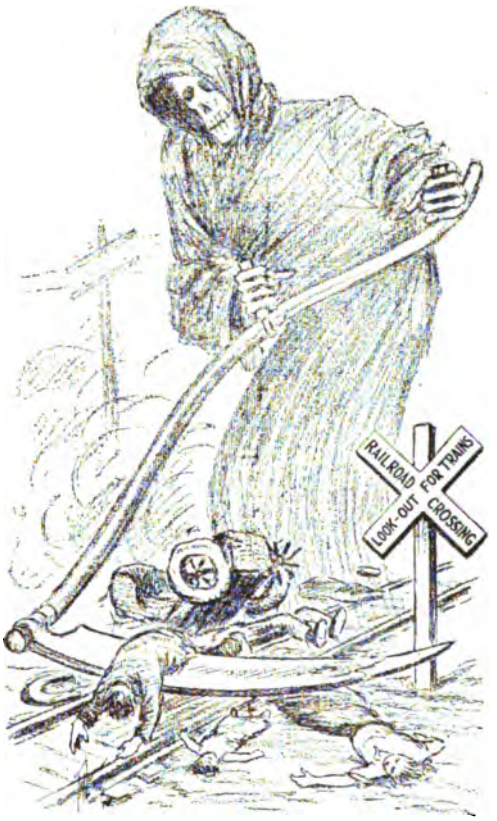
SAFETY ENGINEERING

Vol. 32 JULY, 1916 No. 1

Current Comment and News

THE exhibition of safety devices to be held under the auspices of the National Safety Council at the time of the 1916 Safety Congress in Detroit is arousing interest among those who will attend the Congress and also among the manufacturers of safety devices. The new feature promises to be a valuable addition to the Safety Congress.

President Howard Elliott of the New York, New Haven & Hartford Railroad (which railroad, by the way, is not known to maintain a distinct safety department), says: "We must learn to breathe safety, talk safety, dream safety, if we are to attain the safety habit which in time will prevent even an unconscious act of injury to one member of this family." Is safety a dream on the New Haven? Recently a New Haven smoking car left the rails, turned over on its side, bumped along, toppled over. Six passengers hurt seriously, 20 hurt slightly. An investigation showed that the car was all right structurally and nothing was the matter with the rails! Real weirdness!



Los Angeles (Cal.) Times.

Always Harvest Time

THE report of the National Highways Protective Association shows that during the month of April, 42 persons were killed in New York City in accidents caused by vehicles. Thirty-two deaths were caused by automobiles, 5 by trolley cars, and 5 by wagons. Twenty-three of the dead were children; 18 killed by automobiles, 3 by wagons and 2 by trolleys. For April, 1915, 38 similar accidental deaths were reported in New York City, 21 from automobiles, 10 from trolleys, and 7 from wagons. In the State outside of New York City, 19 persons were killed by automobiles, 1 by trolley and 3 by wagons, as compared with 20 by automobiles, 2 by trolleys and 1 by wagon in April, 1915. The New Jersey record shows that 16 were killed by automobiles, 2 by trolleys and 1 by wagon, as compared with 12 by automobiles and 7 by trolleys in April, 1915.

Comment upon the killing of 23 children should be unnecessary. This needless sacrifice of young lives, those on the threshold of life, must be stopped.

Digitized by Google

"Safety First" campaigns along industrial and railroad lines should by all means include the task of safeguarding the lives of children. Every driver should keep his eyes and his mind fixed on the roadway ahead of him and the sidewalks along that roadway. He should not take chances. His driving should be of the most careful sort when there are children ahead of him, whether in the roadway or on the sidewalk, especially if they are playing.

WITH this number of SAFETY ENGINEERING Rufus W. Hicks, Jr., becomes associate editor, succeeding Carl M. Hansen, whose new duties and removal to another city have caused him to resign the associate editorship. On July 1, Mr. Hansen terminated his connection as secretary and engineer of the Workmen's Compensation Service Bureau in order to assume the duties of managing director of the Pennsylvania Mutual Liability Association and directing engineer of the Universal Safety Company of Philadelphia. Mr. Hansen is the author of the schedule rating system in workmen's compensation insurance, which admittedly has done more to prevent industrial accidents than any other single influence. The Universal Safety Standards, completed by him during the time he was associated with the Workmen's Compensation Service Bureau, are the accepted standards in rating compensation risks. Mr. Hansen's numerous friends and admirers understand, of course, that his resignation of the positions he has held with the Workmen's Compensation Service Bureau is far from signifying any change in his interest or activity in the field of safety engineering. He will be as much interested in the future as he has been in the past in industrial and public accident prevention and his original work in that direction will probably continue to receive attention and commendation in the degree equal to its prominence in recent years. We understand that the series of Universal Safety Standards handbooks will be published in regular course under Mr. Hansen's supervision and direction. Mr. Hansen's service to SAFETY ENGINEERING has been valuable and is to continue, we are pleased to say, as far as his new responsibilities will permit.

Mr. Rufus W. Hicks, Jr., our new associate editor, holds graduate and post graduate degrees of mechanical engineer. He has been connected with the engineering department of the General Fire Extinguisher Company, and for a time was a consulting mechanical engineer in this city. Later he accepted an appointment from the Workmen's Compensation Service Bureau as a mechanical engineer and was an associate engineer of the Underwriters' Laboratories in Chicago. He assisted in the preparation of the Universal Safety Standards and was stationed at the Underwriters' Laboratories by the Workmen's Compensation Service Bureau for the purpose of assisting in the establishment of the casualty department of the Underwriters' Laboratories which was installed to test safety devices, plant equipment and other proprietary articles having a bearing on industrial safety; also for doing research work preliminary to adopting and promulgating the standards of safety to be used by the Laboratories and Bureau. At present he is chief engineer for the Universal Safety Company of Philadelphia.

AT a recent meeting of the Safety First Association of Washington, D. C., Major Pullman, superintendent of the police department, noted the fact that more water accidents than motor accidents are the rule in Washington. During the present fiscal year, there have been 28 deaths from water accidents as against 17 motor fatalities. It should be borne in mind that the season of boating and swimming is at hand and many persons are likely to be careless. The work of educating persons in the safe way to enjoy water pastimes was begun last year in Washington, and is to be continued this season. Public lectures have been delivered before large audiences, telling of needless risks that are run by many persons on and in the water.

Digitized by Google

THE Pittsburgh *Post's* cartoon "Locked out!" is fine symbolically and it is a pity that it does not represent a true condition. It is a common practice to rail against the carelessness of workmen, to say they are reckless, "chance takers," etc. It cannot be argued that workmen, most of them, are always cautious, that they always take pains to "think safety" and to avoid accidents. But it is certainly true that in a factory where the employers are interested in safety a larger proportion of the men are interested in safety than in factories where the employers are lukewarm with regards to safety principles, or even pooh-pooh them altogether. The factory gate, instead of being locked by careful employers against careless men, more often stands wide open to careless workmen who are freely hired because the employers are careless themselves. It will be a proud day in American industrial life when only careful men are wanted. The law of supply and demand operates in the affairs of safety as in other affairs. When employers create an overwhelming demand for safe workmen the supply of safe workmen will equal the demand.

Pittsburgh Post.

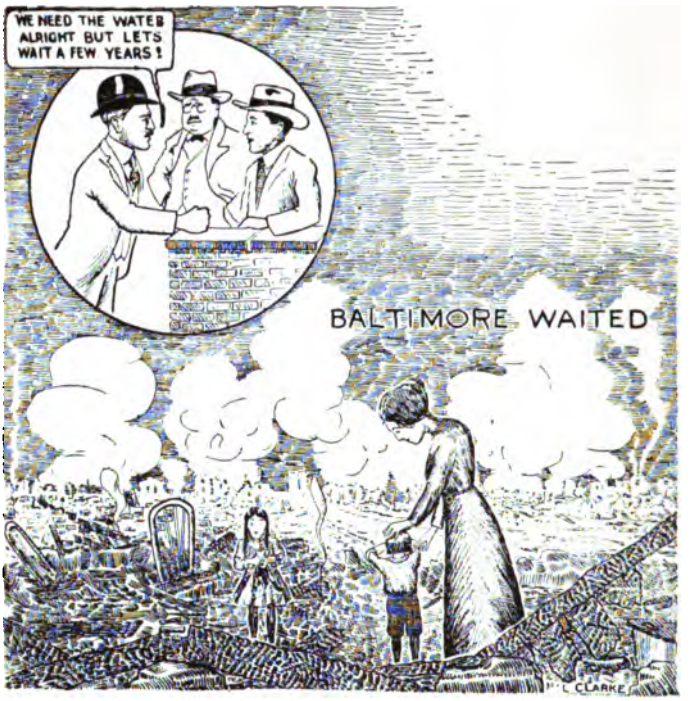
Locked Out!

THE "Big Four" railroad has had 100,000 cards printed to be given by the crossing watchmen to all persons who make it a habit to walk on the railroad's right-of-way. The card reads: "FRIEND: You have picked out a dangerous place to walk. Do you know that over 5,000 people are killed every year while doing just what you are doing now, using the railroad track for a highway? They didn't expect to get caught that way either. A word to the wise is sufficient. Think it over. —A WELL WISHER."

A REPORT has been made by a firm of consulting engineers, Heller & Wilson, to the Board of Fire Commissioners, San Francisco, pointing out the lack of proper fire prevention regulations in that city. It is not the intention to convey the idea that San Francisco is entirely without fire prevention regulations, but it has no special fire prevention ordinance and the present laws are "few, incomplete and inadequate." Except as to theaters, the building code, which contains most of the fire protection provisions, is out of date. It is generally deficient in safety requirements. The object of the report by the engineers is to create a public sentiment that will bring about an early reform.

Digitized by Google

THE engineers of the National Board of Fire Underwriters have told Oklahoma City that "severe individual or spreading fires involving a large part of a block are probable at several points in congested value districts, due principally to the many large and excessive areas and weak construction of the old buildings, serious mutual exposures and frequent high winds, combined with the undermanned and poorly trained fire department and the inadequate and unreliable water supply." The correctness of the conclusions of the underwriters' engineers is recognized by citizens and the *Oklahoman* is doing excellent work in counseling the city to provide a proper water supply. It urges the wisdom of "Water First" as contrasted with a policy of procrastination which may mean "Conflagration First." Numerous cities have suffered conflagrations in 1916. In fact, a tabulation of big fires for the first 87 days of 1916 showed property valued at $45,000,000 destroyed in 151 fires. In Oklahoma City, in January, 40 business buildings were destroyed and 500 people rendered homeless. A city that takes chances on a conflagration, after it is informed of its danger, needs a change of administration at the earliest moment possible.



Oklahoma (Okla.) Oklahoman.

Waiting for a Water Supply. Conflagrations Do Not Wait

Oklahoma (Okla.) Oklahoman.

Where Next?

Digitized by Google

Personal Hazards

By Frank H. Elam

Manager, Casualty Department, American Steel Foundries, Chicago

A lecture before the students of Lewis Institute, Chicago, under the auspices of the National Safety Council.

PERSONAL hazard is some danger with which the individual comes in contact. Personal hazard may be created by ourselves or by some outside circumstance.

Personal hazards are encountered continually by each one of us. Usually we do not allow our minds to dwell on their imminence, nor do we dignify most of them with the fearful regard that such a name as hazard should inspire. In fact, we are too prone to underestimate the dangers that surround us.

The hazards of our present civilization are increasing by leaps and bounds, and it behooves each one to be prepared to preserve intact his body from these dangers.

The nation-wide movement for the conservation of life and limb popularly known as "Safety First" is an expression by those who are engaged in the movement of their belief that the individual does not exercise a control over his destiny. The movement has challenged and routed the age-old doctrine of fatalism with a vigor that is truly inspiring.

We believe that the individual must first be impressed with his ability to assure his own safety. When his education has progressed thus far, he is then ready to consider the safety of his neighbor, and the very fact that he has been impressed with his own need for safety will stimulate an intelligent interest in the safety of his neighbors.

The safety of the masses must come through the awakened conscience and the proper education of the individual. As the number of individuals interested in their personal safety increases, the movement following natural laws extends to larger groups, at which time organization and oversight become necessary.

We are thoroughly convinced that accidents are the result of definite causes and are not the result of chance; that if care and forethought are exercised in orderly and continuous sequence the individual will escape the danger that would otherwise befall him. If all correlated groups of individuals will consider the safety of others as well as their own, accidents resulting from the lack of care of an individual will not befall some person who, while exercising the utmost care as an individual, may be taken unaware and, therefore, unprepared.

The majority of accidents follow as a result of a lack of thoughtful preparedness of the individual to meet the hazards that custom and ignorance have allowed to come into existence. We are slowly learning or realizing that these hazards are the result of indifference and neglect that border on the criminal. As the public, or mass-conscience, becomes educated and aroused to this view of the situation, these hazards will be eliminated. Until they are eliminated, it behooves the individual to prepare to meet the situation by personal care and attention.

During the early days of the nation we are informed that a large portion of the time and attention of the individual was devoted to his own personal safety and that of those dependent upon him. The hazards consisted of savages, wild beasts and the untrained forces of nature which had to be subdued or harnessed. As the country became settled most of these dangers disappeared and gradually new dangers came into existence. Railroads, steamboats, street cars, power-driven machinery and electrical energy in its manifold uses brought dangers which were recognized in a way, but which for many years were allowed to take their toll of victims without any organized effort toward prevention being made. In other words, mechanical progress developed faster than the agencies for the conservation of life and limb.

Digitized by Google

"Loose and flowing sleeves should never be worn by machine attendants"

The machine had been given a greater importance than the human being who had created it or who was delegated to manipulate it. When this situation was at last recognized and remedies sought, it was found that the remedies could not be applied in a wholesale manner, but would have to start with a foundation composed of the individual or unit. This was rather a disheartening discovery. By this time we were so used to doing things in a large, off-hand way that to find we had to go back to the slow methods of the days of small things in our safety planning has proved irksome. This is the reason why many who investigate the subject of safety, expecting a revelation of new wonders, are disappointed when they find that safety is not wonderful nor mysterious nor even new, but is the application of laws of self-preservation changed to meet the new conditions under which we must work and live.

Safety is something very personal. We cannot delegate the exercise of it to another in our behalf, but we have to think about it and make it a part of our conscientious effort. For this reason our safety education should receive our most careful attention. It is of more importance than any other form of education; no matter what our attainments may be, if we do not have the training to work and live safely, we shall not long enjoy the use of training or accomplishments along other lines.

The education of the individual concerning personal hazards begins in infancy and continues, usually in a haphazard manner, during life. The instruction imparted by those having the training and oversight of the child is usually of a negative order, consisting principally of admonitory "don'ts," which fail to satisfy the inquiring mind seeking a reasonable solution of the impressions that are crowding upon it. If the training were positive, the child mind would accept as reasonable the instructions given and would be better satisfied. As it is, tell a child *not* to do a certain thing, and naturally he wants to see what will happen if he *does* it, with the result that if the experience has not been fatal, knowledge has been acquired by experience which should have been received vicariously.

The result of this negative training begets the habit of "taking a chance" which is conducive to so-called accidental injuries. It is one of the gravest obstacles that the safety movement has to meet and overcome.

We find our most intelligent workmen frequently antagonistic to safeguards and safety regulations because they seem to feel that to admit the need or neces-

Digitized by Google

sity for them is an admission of weakness and evidence that they are lacking in nerve. Some men feel that to take a chance and "get away" with it gives them a distinction or pre-eminence among their fellows. This faulty view of personal hazards must be superseded by a safe and sane one, recognizing the fallacy and danger of such reasoning and placing true value on the blessing of an unmaimed and sound body. One of the things that education in personal safety suggests or emphasizes is that in every vocation there are special hazards or dangers which have to receive attention and forethought in order to escape them.

The fact that personal hazards are usually so obvious makes a recital of them and their prevention seem tiresome and commonplace.

First on the list of hazards I am going to place Deficient Thinking. It has been said that "as a man thinketh, so is he." It can also be said that as a man fails to think so is he not. We cannot be efficient in any line of endeavor without thought, and until the individual thinks about safety he is not going to live safely. The advent of every new experience should be a signal for careful and immediate thought, so that the dangers, if there are any inherent in the situation, may be recognized. We catalog unconsciously most of the dangers that we meet daily, but it would be better if we gave them careful thought to learn of the dangers that are not so obvious, and which may appear unexpectedly.

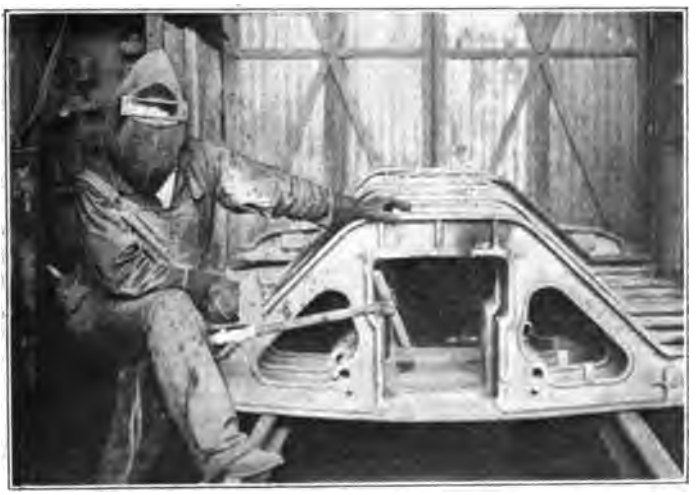
Employers find that men new to a particular kind of work are more liable to injury than old employes. The reason is obvious; but the new employe, if he is thoughtful, may discover and guard against the hazards of his new employment and not have to learn them by experience.

It does not take experience to safely cross a street where the traffic is heavy, but it does take thought and attention to traffic rules and to what your neighbor is doing or is going to do. Most street accidents are the result of lack of thought on the part of some one. When we are traveling along a thoroughfare we should never allow ourselves to become so absorbed in thought or conversation as to become oblivious to our surroundings. The chief business in hand is to reach our destination safely. If we fail in the safety part of the trip, in the majority of cases we fail in the object for which we have made the trip.

"Safety goggles are now recognized as the one and only means of preventing eye injuries in the cleaning rooms of foundries, in grinding operations with emery wheels, in sand-blasting and shot-blasting, in boiler shop and similar occupations, on the pouring floors of foundries to prevent hot metal from burning the eyes, in the machine shop as a protection from the chips from lathes, planers, etc., and as a protection wherever babbitt metal is being poured"

The person who has failed to properly study and classify the dangers which must be constantly met is unprepared for an emergency when it comes, and

Digitized by Google



"Helmets and masks are being used more and more as a means of protecting the faces of workmen from harm in electric arc welding, sand-blasting and similar occupations"

will often yield to impulsive action which frequently causes injury. For example we find workmen in foundry-cleaning departments yielding to an impulse to catch falling castings, an action invariably resulting in a crushing injury which should never occur, because, if the workman has given the matter any thought at all, he has decided that the castings will not be damaged by falling, and that the proper thing for him to do is to get out of the way. With this course of action predetermined, the subconscious mind will be prepared to act in such an emergency and the impulse will be inhibited. The necessity for this mental preparedness extends to every line of endeavor. The machine operator should study his equipment, and endeavor to anticipate all the emergencies that may arise. He should decide just what he will do under every conceivable circumstance.

In the past, this mental equipment to anticipate dangerous situations has, in most cases, been acquired in the slow and many times inefficient school of practical experience. We refer to such workmen as experienced, and in many instances a physical examination will reveal at what a dreadful cost the experience has been acquired. I do not wish to be understood as speaking slightingly of practical training. It has produced wonderful results with the material at hand. But I do wish to make the point that safety demands that the theoretical training shall be imparted to the workman first, so his mental processes shall be stimulated, and as his training progresses the theoretical shall continue to be an important part of that training. This, to my mind, is the most important part of the safety propaganda. We ourselves must think. We must help others to think that both they and we may be safe. If men refuse to think, and that is what happens when they are careless, they should be separated, isolated from their fellows. We must demand of ourselves and of our fellow-men a larger equipment of mental efficiency for safety.

The second subdivision of personal hazards will be "Clothing—Proper and Improper."

It is recognized by all races, no matter how low in the human scale, that clothing or dress bears an important relation to life in its various activities. There is no need to dwell at length on the general recognition given to dress for social or other special occasions. The necessity for dress in accordance with the time, occasion, and station in life of the wearer has been recognized since clothing was first donned by primitive man.

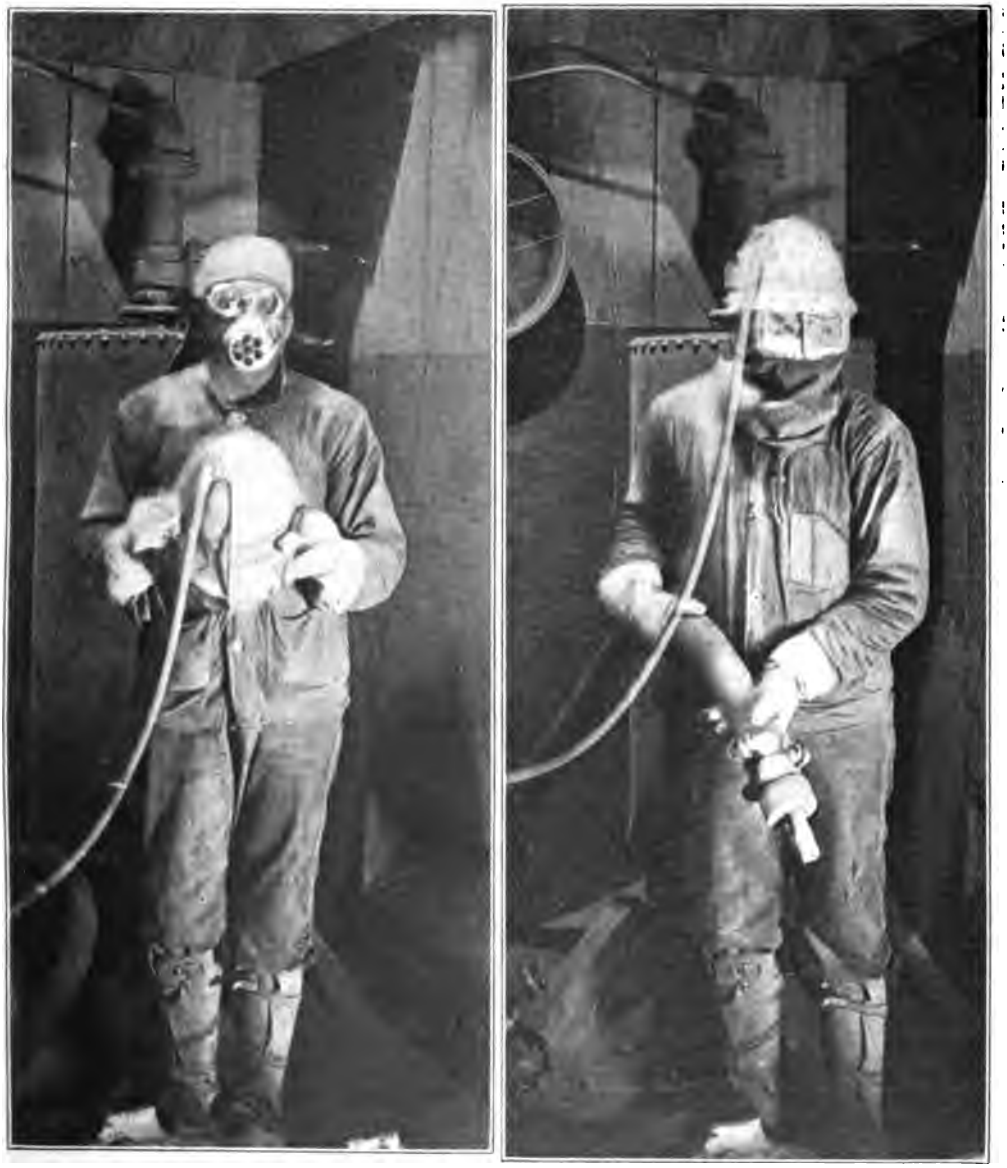
The adoption of properly designed working garments has been slower in this country than abroad, no doubt for the reason that anything approaching a uniform is looked upon as a badge of service, as being contrary to American independence. The feeling of most individuals is that, while they may have to follow a certain occupation for a livelihood, they do not care to wear clothes that will advertise the fact that they are so engaged.

We are told that Lafayette on his sec-

Digitized by Google

ond visit to this country was met everywhere by crowds of citizens "dressed in their Sunday best," and that he asked in amazement, "Where are the common people?" I am glad that in this country most of us have the means to dress in such a manner when in public that attention is not called to our vocations or occupation, but we should recognize the important fact that clothes which are suitable for dress occasions and hours of leisure are, in most cases, improperly designed for work, and before they are used for that purpose should be altered to meet the new conditions under which they are to be worn.

The hazard created by improper clothing is a very serious one. Its elimination



"Respirators are preventing injury to workmen in the so-called dusty occupations, such as sand-blasting and shot-blasting, dry paint grinding and polishing and buffing operations"

Digitized by Google

"Leggings should be worn by oilers and sand-blasters and shot-blasters, as they prevent many injuries to men engaged in such work"

is going to be slow because it is one of the many things in accident prevention dependent upon the intelligent recognition of the individual. Proper working dress can hardly be regulated by law and the employer who attempts too drastic requirements in this respect will meet with the most violent opposition from his employes. Great tact is necessary, therefore, in handling this subject and the reasonableness of all such regulations should be fully explained to those affected. The employer owes to his employes the duty of calling to their attention the hazards of his work and especially those which may result from improper clothing. He also owes to society and to himself the duty of seeing that these hazards are reduced to the minimum obtainable under present economic conditions. This duty of the master, as the law expresses it, is recognized by our legislative bodies in that in case of accident the injured employe is not penalized for being improperly clothed, but the master is for allowing him to work while so clothed. I take it that the law by implication recognizes the master's right to require the employe to meet all reasonable requirements in this connection.

Clothing worn by workers should never be allowed to impede free and unrestricted movements. Long or cumbersome overcoats should not be worn where there is the slightest danger that they will catch in moving machinery or trip the wearer. Loose and flowing sleeves should never be worn by machine attendants.

Shirts, jumpers, coats, etc., should never be worn open, but should be fastened to prevent their catching in moving machinery.

A workman on a spring coiling machine was wearing an unbuttoned jumper which was caught by the spring steel as the coil was formed. He was thrown completely over the machine, landing on a pile of material. Fortunately he was not seriously hurt, but received an object lesson on the dangers of loose clothing.

Trousers and overalls with a cuff should not be worn, as the cuff is likely to be caught by projections on material, causing serious injury from falls.

Neckties, handkerchiefs around the neck and long hair are all personal hazards which should be eliminated. Each of these things has caused the death or serious injury of many workpeople.

Articles of adornment, such as finger rings, chains and fobs, should be removed before starting to work. Injuries resulting from rings catching on moving objects, stripping the flesh from the finger bones or causing the severing of the fingers, are too well known to merit more than passing mention. Metallic articles of adornment add to the hazard of electric shock to workmen.

The introduction of the safety goggle as a protective measure has marked one of the greatest advances that has been made in accident prevention. Safety goggles are now recognized as the one and only means of preventing eye injuries in the cleaning rooms of foundries; in grinding operations with emery

Digitized by Google

wheels; in sand-blasting and shot-blasting; in boiler shop and similar occupations; on the pouring floors of foundries to prevent hot metal from burning the eyes; in the machine shop as a protection from the chips from lathes, planers, etc., and as protection wherever babbitt metal is being poured. It is safe to say that many thousands of eye injuries are being prevented each month by the use of the safety goggle, and many thousand more will be prevented when workmen do their full duty in wearing goggles.

Goggles or eye-glasses with colored lenses are protecting the workmen of today from harmful light rays in such occupations as steel marking, acetylene welding, electric arc welding, etc.

Helmets and masks are being used more and more as a means of protecting the faces of workmen from harm in electric arc welding, sand-blasting and similar occupations.

Respirators are preventing injury to workmen in the so-called dusty occupations, such as sand and shot-blasting, dry paint grinding and polishing and buffing operations.

Gloves are a hazard when made of the wrong material or wrongly used. The cotton flannel glove is popular on account of its cheapness and can be safely worn in many occupations, but it should never be worn when there is danger of its causing any injury.

Recently there came to my attention a case where a drill-press man wearing a cotton glove was applying a lubricating mixture with an oil can. A shaving from the work caught in the finger of the glove, causing the hand to be drawn to the spindle of the drill-press and instantly the operator was being thrown around it at the rate of 200 revolutions per minute.

Gloves and mittens are a means of

"Foot accidents in all lines of work can be greatly reduced by wearing proper shoes"

"The need of specially designed shoes for certain occupations has been recognized for a number of years, and many employers are encouraging their workmen to wear these special shoes by selling them at cost price"

Digitized by Google

protection where rough material has to be handled. Workmen so engaged should be encouraged to use this form of protection by the employer's making it possible to purchase them at cost.

Leggings should be worn by oilers and sand and shot-blasters as they prevent many injuries to men engaged in such work.

Proper attention given to the shoes worn will greatly reduce the personal hazard in many occupations. We forget that the feet are very vulnerable parts of the body and must be protected or guarded, and that shoes are primarily intended as guards or protectors of the feet. If we all fully realized this fact, we would see that our shoes were better designed for this guarding purpose, and would not pay so much attention to making the shoes look attractive as an article of personal adornment. We would see that the soles of shoes were adequate and substantial, that the heels furnished the right amount of elevation and provided sufficient surface to support the body, and that the uppers were made of leather that would best serve to protect the upper parts of the foot. We should know that it is false economy to wear a worn pair of dress shoes while engaged in work where the feet are subjected to dangers of any kind.

The need of specially designed shoes for certain occupations has been recognized for a number of years, and many employers are encouraging their workmen to wear these special shoes by selling them at cost price. Many foundries carry in stock a number of accepted designs of congress shoes for the workmen in the pouring department. Shoes with protecting boxes in the toes are provided where there is danger of falling material crushing the feet. Foot accidents in all lines of work can be greatly reduced by wearing proper shoes.

I have mentioned some of the more obvious and easily recognized personal hazards, but the list could be extended to mueh greater length if time permitted. The writer hopes that each one will study for himself what are his personal hazards and will take adequate precautions to ward off the possible resulting dangers.

Hazard of the Shingle Roof

THE National Board of Fire Underwriters has issued a pamphlet entitled, "Shingle Roofs as Conflagration Spreaders," being "an appeal to the civil authorities and civic and commerial. bodies."

A brief history is given of a number of disastrous conflagrations directly traceable to combustible roofs:

May, 1901. Jacksonville, Fla. Loss, $10,050,000.

May, 1904. Yazoo City, Miss. Loss, $2,000,000.

September, 1908. Chisholm, Minn. Loss, $1,700,000.

April, 1908. Chelsea, Mass. Loss, $12,000,000.

April, 1909. Fort Worth, Tex. Loss, $800,000.

July, 1910. Wallace, Idaho. Loss, $1,000,000.

April, 1911. Bangor, Maine. Loss, $3,500,000.

February, 1912. Houston, Tex. Loss, $4,500,000.

September, 1913. Hot Springs, Ark. Loss, $2,225,000.

June, 1914. Salem, Mass. Loss, $13,000,000.

March 21-22, 1916. Paris, Tex. Loss, $11,000,000.

March 22, 1916. Nashville, Tenn. Loss, $1,450,000.

March 22, 1916. Augusta, Ga. Loss, $4,500,000.

The pamphlet is illustrated with photographs of some of these conflagrations showing the actual fires or the result of their devastations. In conclusion, a suggested ordinance "providing for fire-resistive roof coverings and specifying fire test for approved fire resisting roofing," is quoted as given in the Building Code of the National Board of Fire Underwriters.

Digitized by Google

Fire Prevention: A Personal Responsibility

By H. W. Forster

Independence Inspection Bureau, Philadelphia

An address at the closing Safety Rally at Soldiers' Memorial Hall, Pittsburgh, on Wednesday evening, June 21.

PICTURE, if you will, a street 1,000 miles long, extending from New York to Chicago. On both sides of the street for the entire distance, and occupying an average frontage of only 65 feet, are homes, factories, stores, schools, churches, and all other types of buildings which man erects for his convenience. Picture these buildings teeming with life, women and young children in the homes, the factories humming with industry, the stores manned with their work forces and thronged with shoppers, the schools attended by tens of thousands of children, and the streets filled with people and with conveyances hurrying about their business. Consider the courage, effort, and material which have been required to bring about the situation. Then picture, if you will, a fire breaking out in New York City and spreading westward along this street at a rate of 3 miles a day, reaching at the end of a year the other end of this highway. There you have graphically what we suffer in the way of fire losses each twelve months.

If we were to walk along that street of desolation, we would come upon an injured person every 1,000 feet, and upon a corpse every half-mile.

Such has been the annual sacrifice that we have offered on the altar of the god of fire. As in ancient days, burnt sacrifices have brought no returns.

What brings about this tremendous and shameful situation, as bad as that of practically all the rest of the civilized world put together? Carelessness and ignorance, the same things which have produced our great industrial accident totals.

Can we hope to reduce this fire waste, and I speak now particularly of the loss of life that accompanies it? We certainly can. The proof lies in the splendid record that we have made in bringing about a sane Fourth of July. In 1903, we killed 466 persons, and in 1915, only 30, a reduction to one-fifteenth of the former record, and brought about by persistent and intelligent preaching of the unbelievable stupidity of offering our children and ourselves on the supposed altar of patriotism.

Most of us have the idea that Iroquois Theater, Collingwood School, Triangle Waist, Binghamton Clothing, Pittsburgh Paper Box, and similar fire horrors are responsible for the appalling totals of lives lost by fire. All the fire disasters of the last 10 or 15 years added together will hardly equal the average annual death total. The disasters get on the front pages of our press. They shock us. They are responsible for improvement in building ordinances and supervision, but we, the rank and file of the citizens, primarily through fires in our own homes, produce the results which are one of the indications of our national disregard for human life. These dwelling houses, tenement, apartment, and hotel fires, get comparatively fleeting publicity, because they lack the spectacular qualities of those listed above.

Who burns to death in these American homes? The husbands, fathers, and big brothers? Not often. The wives and mothers, and the children, especially the little children. In hundreds of homes all over our fair land each year there comes the crushing sorrow of a dead mother or child,

Digitized by Google

burned to death in almost every case because of the almost criminal disregard which we as a nation have for the most elementary principles of safety from fire. It is conservative to say that we lose through this agency each year almost 1,000 of our most precious assets—our children.

How shall we improve this situation? By continuing to use all of the agencies that are at work on the problem, and by being broad enough individually to realize that we have to do our definite part in cutting down our life and property losses. Some of us, through our business and other activities can do a general work, but all of us can display personal interest in and activity for fire prevention. Like charity, fire prevention begins at home. You have to teach the children the fundamentals of fire prevention, and while you are teaching them these, you will be surprised to see how much you learn yourselves. Think of the safety of the child itself and of the fact that in a short span of years the children of today will have in their hands the direction of the affairs of the nation and will have grave responsibilities for the safety of life of many of their fellow citizens.

In the short time available I can only touch upon a few of the signally important fire prevention measures that need attention in our homes.

Cleanliness, generally speaking, is considered next to godliness, but in fire prevention it is absolutely first. Sparks and brands, from which practically all fires start, are dangerous in the ordinary cellar almost only when there is loose, inflammable material around. I plead with you with all the sincerity that intimate knowledge of fire causes has given me to keep your cellars free from every bit of unnecessary inflammable material. Remove the rubbish, excelsior, hay, crates, barrels, papers, etc. Keep your cellar so clean that you are proud to show it to your visitors. Do the same thing with the attics and closets.

Mr. Franklin H. Wentworth, of the National Fire Protection Association, the most effective preacher of the fire prevention gospel in our country, spoke of the fact that we use as many matches as all the rest of the world put together, and added, "The American breathes imprecations if he cannot at any moment of the day or night, reach out his hand and find a match. They repose in the pockets and linings of every old coat and vest; they are scattered about desk and bureau drawers; they are found in every accumulation of rubbish wherever it may be; they are so carelessly and recklessly thrown about that rats and mice have adopted them as a standard article for nest-building, certain always of an available supply."

Perhaps, a fifth of all fires are due to the careless use of matches, and perhaps half of our babies burn to death because they play with the dangerous kind. If you value your homes and your families, use only safety matches, which strike on the box, and be careful in how you dispose of the burnt sticks.

Open flames from stoves, fire-places, bonfires, gas fixtures, candles and lamps, are responsible for many fires, and particularly dangerous where inflammable clothing of women and children is brought near them. It only takes one fleeting breath of fire to burn out the throat and lung tissues of a person and cause death.

Everybody knows that rubbing a cat's back on a winter's day, dragging the feet across the rug, or running a rubber comb through the hair, brings about a spark of the kind known as static. Few people have realized that when clothing and gloves are cleaned in gasoline, the rubbing of the goods may produce a similar spark, ignite the gasoline, and give the local undertaker professional business in one's house. It is exceedingly dangerous to do anything with gasoline under any conditions, and any woman who has clothing of the kind that requires dry cleaning should be able to send it to a cleaner who, in spite of his precautions against this danger, is considered a most undesirable fire risk by the insurance world.

Fire prevention is nothing in the

Digitized by Google

world but common sense and careful forethought applied to our homes, the equipment we put into them, and the use we make of it. If, as a result of this appeal to you for a feeling of individual responsibility for the fire loss, you men and women go home, clean out the refuse, buy safety matches hereafter, keep the children away from fires, and do no more dry cleaning, the cause will have advanced materially, and, if I can hear of a few results of this kind, I will be a very happy man.

To sum the matter up:

1. Our fire waste is due almost altogether to ignorance and carelessness.

2. Many of the fires and most of the life loss is in the homes over which we, as individuals, have control.

3. We must inform ourselves and instruct our children in the fundamental safety measures, which are well understood, and which appeal to every man's common sense when he gives the subject thought.

4. And the result will be that in due course we shall make slashing inroads into an economic loss of something like one-half billion dollars per year, and conserve the lives and limbs of thousands of our citizens.

The Railway Locomotive as a Fire Fighter

By Robert Scott

Railway Fire Protection Association

IT has been demonstrated by experience that yard engines equipped with fire extinguishing apparatus have become a potent factor in confining fires to the incipient stage. This class of protection around railroad property, especially at terminals and in car yards, where a water system is not available is of incalculable value.

A number of railroads of the country today have equipped their yard engines at various places throughout their entire systems with fire extinguishing apparatus.

One of the chief claims of advocates of this form of protection is its flexibility in that it can be moved about from place to place and is always in readiness for operation.

On one large system approximately 10 per cent of the fires extinguished during the year 1915 were put out by this means. This speaks well for the system and shows conclusively that it has passed the experimental stage.

Tests of certain kinds of devices have demonstrated that a stream of water can be thrown 70 feet from ⅝-inch hose nozzle attached to 150 feet of 2½-inch linen hose.

The cost of attaching fire fighting apparatus to yard engines ranges all the way from $25 to $250 per locomotive, depending entirely on the kind of device used and character of equipment furnished.

As to the hose, some roads use light inexpensive hose, although most of them have found that extra heavy, double-jacketed linen hose is most suitable. It is the practice of some to provide a box on rear of tender, while some roads keep it under the running board on front part of the locomotive. Several lines claim that the most practical place is in roof of cab where a suitable rack is provided.

One large system has equipped all of its local freight switch engines with fire fighting apparatus, and they are considered indispensable in the case of fires among rolling stock and buildings adjacent to the tracks. Enginemen and trainmen are drilled so as to respond to alarms promptly, and by a code of signals they are told just where the fire is located. It is most important that close and regular inspections be made so as to insure the reliability of the equipment.

Digitized by Google

Electrically Controlled Engine Stops and Speed Limit Governors

Rules and Requirements for Their Installation and Maintenance by the Department of Labor of New Jersey

Realizing the importance of promptly shutting down machinery in hazardous industries and guarding against fly-wheel explosion, the Department of Labor of New Jersey has deemed it necessary to prepare a standard set of rules and requirements for the installation and maintenance of engine stops and speed limit governors. Much unsatisfactory and unreliable equipment has been permitted to be employed throughout the United States and the New Jersey Department of Labor says: "We have felt that the time has arrived to state specifically the nature and type of systems which will be required to pass inspection in this State."

RULES and requirements for the installation and maintenance of electrically controlled engine stops and speed limit governors for engines used for the purpose of furnishing power in manufacturing establishments:

1. GENERAL.

a. All devices and equipment constructed and installed under these rules and requirements shall be expressly approved by the Department of Labor for the purpose for which they are intended.

b. The installation shall essentially consist of an electrically controlled, unless otherwise approved by the Commissioner of Labor, mechanically actuated valve for shutting off the steam supply to the engine, a vacuum breaker (where necessary), a speed limiting device, one or more remote electrical control stations and a trouble signal.

c. Before preliminary approval is obtained for any equipment the building owner or his agent must file with the Department of Labor duplicate floor plans of a permanent character showing the complete equipment, location of remote control stations, exits and partitions. The owner or agent shall also file together with the floor plans a general description of the apparatus proposed for installation in duplicate containing such detailed information as is necessary to a complete understanding of the installation and operation of the system, together with a statement of the make and type of equipment to be used. A copy of the approved plans and specifications will be returned as authority to proceed with the work.

d. Information shall be obtained from the Department of Labor as to location and number of remote control stations required in any building within the intent and meaning of these rules.

e. Provision shall be made to guard against shutting off power for operating elevators and for lighting exits.

f. A suitable alarm signal shall be provided to notify all operators before shafting is started.

g. When two or more generators are operated in unity and the associated engines have been or are required to be equipped with engine stops and speed limit safeguards, approved circuit breaker equipment shall be provided to guard against a reversal of current flow by reason of a loss in voltage of any generator, due to the automatic or manual shut down of its associated engine.

2. WORKMANSHIP AND SUPPORTS.

a. All work shall be done in a workmanlike and neat manner to the entire satisfaction of the Department of Labor.

b. All material shall be rigidly secured in position and when attached to masonry walls shall be properly secured by the use of metal expansion shields or toggle bolts. Wooden plugs will not be acceptable.

3. TESTS.

a. All systems shall test free of grounds and upon completion of the engine stop system, a satisfactory test of

Digitized by Google

the entire equipment shall be made in the presence of and under the direction of representative of the Department of Labor. (NOTE.—It is recommended that contracts entered into by the owner of a building shall contain a clause requiring a guarantee against any defects in material or workmanship for a period of two years from the date of final acceptance by the Department of Labor and any defects which may develop in the equipment during this period shall be remedied by the contractor without expense to the owner.)

4. DESCRIPTION OF SYSTEMS.

a. An operating current of 50 per cent in excess of that which is actually required to operate the system shall be maintained through an all closed circuit.

b. Remote control devices in all cases shall be on closed circuit.

c. A meter or other approved device to indicate the current flow shall be provided in the circuit.

d. An enclosed trouble bell not less than four inches in diameter with magnets wound to not less than 10 ohms resistance shall be provided in connection with the closed circuit to ring continuously in case of weakened current flow or an opening of the circuit. The bell, which shall be of the vibrating type, shall be placed in the engine room. At least four cells of wet or semi-dry battery of approved make and type shall be provided to actuate the bell. The bell and battery shall connect with the contact of a relay having its magnet windings in series with the closed circuit.

5. MAINTENANCE.

a. The system including valve and speed limiting control shall be tested at least once every working day (preferably at the starting hour).

b. Each remote control device shall be operated at least once every month.

c. A record shall be kept of the operation of each system which will be subject to inspection by the Department of Labor.

6. ENGINE STOP VALVES.

a. Engine stop valves may be of the gravity closing type or balanced type and shall be of a character which combines both the trip and throttle valve features, except by special permission in writing from the Department of Labor.

b. Engine stop valves shall be provided with a retardation feature of suitable design to prevent slamming.

c. Engine stop valves shall be installed directly on the engine and shall control the steam to one engine only.

d. All mechanical arrangements for connecting and releasing the disc shall be on the outside of the valve and readily accessible for inspection.

e. Stop valve trips shall be actuated by gravity and the weight shall be held in suspension electrically.

f. Butterfly type valves or others of a leaky character and valves having internal dogs or clutches will not be approved.

7. SPEED LIMITING DEVICES.

a. With every engine stop valve there shall be installed a speed limit governor entirely independent of the steam engine governor or governor belt.

b. Speed limiting devices shall be of substantial design, fully enclosed in a metal case made dustproof as far as possible and shall be under lock and key. They shall be supported by a heavy stand firmly secured to the floor or solidly attached directly to the engine and shall be adjustably mounted.

c. Independent speed limit governors shall normally run at from three to five times the speed of the engine and all speed limit governors shall be so adjusted and locked that the engine cannot exceed 10 per cent of its normal speed.

d. The tripping of the engine stop valve by the speed limit governor shall be accomplished by shunting out of the circuit the trip valve operating magnet windings or by opening the circuit.

e. Electrical contacts shall be ample in area not only to carry the current used in operation but to insure long life, and shall be of a design which may be readily renewed.

8. VACUUM BREAKER VALVES.

a. With engine running condensing, a vacuum breaker valve shall be provided where deemed necessary in the judgment of the Commissioner of Labor to admit

Digitized by Google

atmosphere into the condenser or exhaust line between the condenser and the engine for the purpose of destroying the vacuum therein immediately upon the tripping of the engine stop valve. This vacuum breaker valve shall be connected by a pipe line to an automatic pilot placed on or by the trip throttle valve or by other approved methods and so arranged that the vacuum breaker valve is positively and simultaneously tripped with the throttle valve and by the same movement of mechanism.

9. REMOTE CONTROL DEVICES.

General.

a. There shall be one or more remote control devices on each floor of the building.

b. Control devices shall be so designed that the series circuit of which they are a part will be opened upon breaking the glass front.

c. All control stations as a general rule shall be mounted with the lower edge five feet from the floor.

Design and Construction.

d. There shall be a metal case completely enclosing the mechanism and made dustproof as far as possible by the use of gaskets or other suitable means. The case shall be drilled and tapped at top and bottom to receive standard conduit. All parts shall be of the best grade and workmanship. Contacts shall be of the scraping type and current carrying parts shall be thoroughly insulated from the box. Insulation shall be of a material specifically approved for the purpose.

10. RELAYS.

a. Trouble bell relays shall be mounted in a vertical position, magnets up, and shall be enclosed in a metal case under lock and key and located where there is no danger of sparking contacts igniting inflammable gases or flyings.

b. Trouble bell relays shall be mounted where they will be least affected by vibration and in no case shall they be mounted on partitions or backboards with bells or other vibrating devices.

c. Relays or magnets employed to trip or otherwise set in motion the mechanical valve closing mechanism shall be plainly marked with the current operating values at which their armatures will pick up and drop away and the resistance of the magnet windings. They shall also be fully enclosed in a metal case and shall be made dustproof as far as possible when deemed necessary by the Commissioner of Labor.

11. WIRING.

a. All conductors shall be run in approved metallic conduits or armored cable installed as follows: Conduits and armored cables, when not terminated in drilled and tapped fittings, shall be rigidly secured to all fittings by approved lock nuts and bushings. Conduits shall be not less than ½ inch internal diameter where not more than four conductors are used, and where a greater number of conductors are used the internal diameter of the conduit shall be at least 3/16 of an inch larger than the outside diameter of the bunched wire it is to accommodate.

b. Engine stop conduits shall not contain any foreign wires whatever.

c. The conduit system shall be permanently and effectually grounded. Approved ground clamps shall be used for this purpose.

d. All wires shall be rubber-covered and braided National Electric Code standard. Wiring in all systems shall be installed after the manner prescribed under National Electric Code rules as applying to conduit and armored cable installation, except that single-braided wire may be used.

e. No conductor of less than No. 14 B. & S. gauge, nor having a rubber insulation wall of less than 3/64 of an inch in thickness, will be approved, except by special permission of the Department of Labor.

f. Where wires pass from one building to another, they shall be enclosed in rigid conduit underground between buildings wherever possible, and when so installed shall be lead encased.

g. Wires between buildings when not run in conduit shall be at least equivalent in conductivity and tensile strength to No. 12 B. & S. gauge copper. They must be supported at least every 75 feet on approved glass insulators and brackets. As far as possible, they should be run

Digitized by Google

under rather than over electric light or power wires.

12. SOURCES OF ELECTRICAL ENERGY.

The following sources of energy may be employed:

1. Electric light or power system, A. C. or D. C.

2. D. C. electric light or power system (Public Service or isolated plant) supplemented by storage batteries controlled by automatic throw-over device.

3. D. C. electric light or power system with storage batteries floating on the line.

4. Primary batteries of approved type by special permission of the Commissioner of Labor.

13. STORAGE BATTERIES.

a. Storage batteries may be employed if under competent supervision and equipped with reliable charging and controlling devices.

b. Storage batteries shall be of approved make and type and shall be capable of maintaining the system efficiently for three days without recharging.

c. Storage batteries shall be installed in an approved manner in properly ventilated protecting cabinets and, wherever possible, shall be placed in a room not containing fire alarm or other electrical apparatus. If these batteries are placed in a separate room, with proper ventilation, and where they will not be subject to mechanical injury, protecting cabinets will not be required.

d. The batteries shall not be disconnected from the engine stop system during working hours in the factory.

e. A full description of the operation of each system, together with instructions for its proper care and maintenance, shall be posted in a conspicuous place and in a substantial manner, accessible to the person in charge of the system.

f. The potential of a charging or operating circuit shall not be over 250 volts.

g. Where storage batteries are employed suitable provision shall be made on a switchboard for charging the batteries, with approved means of protecting them against injury due to interruption of the charging current.

h. A voltmeter shall be provided on every storage battery switchboard.

i. Resistance units of approved type shall be employed in dissipating the energy incident to a reduction in potential in all systems taking energy from light and power circuits and such resistance shall be equally proportioned in each leg of the circuit in ungrounded light or power systems.

Resistance units shall not unduly heat in any case.

Lamps will not be acceptable for resistance.

j. Fuses in all circuits shall be not less than 25 per cent nor more than 50 per cent in excess of normal load on the circuits which they protect.

k. Engine stop systems operating directly on light or power circuits shall have suitable provision made on a switchboard for resistance units, switch, fuses and other instruments.

14. PRIMARY BATTERIES.

a. Primary batteries employed on closed circuits in engine stop systems shall be of approved type and of sufficient capacity to operate the system continuously for a period of at least three months and shall be in duplicate with approved throw-over switch so designed that when shifting from one set to the other the circuit will not be broken. Approved heat resisting glass jars are preferred, but at least one glass jar shall be used in each set for the purpose of observing the condition of the elements. The working voltage of approved closed circuit cells is .65 volts per cell.

15. CABINETS FOR BATTERIES.

a. All batteries except as elsewhere noted shall be placed in substantial, well-fitted cabinets, elevated not less than 6 inches and not more than 6 feet above the floor and located in a clean, dry place, where the temperature will not fall below 40 degrees Fahr. nor rise above 100 degrees Fahr.

b. Cabinets shall be provided with shelves of wood not less than 7/8 of an inch in thickness or of other approved material, properly fastened and secured to prevent sagging.

c. Cabinets shall be so constructed that the conditions of the elements may be observed without disturbing the cells.

Digitized by Google

d. Metal cabinets shall be of approved type, constructed of sheet iron or steel of not less than No. 14 U. S. metal gauge.

e. Doors shall be provided with lock and key and kept locked.

f. The interior and the exterior of metal cabinets shall be painted with two coats of asphaltum compound, each coat to be thoroughly dried before the next is applied. Baked enamel will be accepted in lieu of the above.

g. Wooden battery cabinets shall be constructed of the best grade of kiln dried wood of not less than ⅞ of an inch in thickness. Doors shall be provided with padlock and kept locked.

Wooden cabinets shall be painted on the interior with two coats of asphaltum compound and on the exterior with two coats of lead paint, varnish or asphaltum compound.

The foregoing rules relating to the design and construction of appliances are but a partial outline of requirements. A device which fulfills the conditions herein outlined and no more, will not necessarily be acceptable. Samples of all appliances should be submitted to the Bureau of Electrical Equipment, Department of Labor, for examination and report before being introduced for use.

The A B C of "Safety First": Always Be Careful

By Fred Koenig

Foreman, Newburgh Wire Works, American Steel & Wire Company.

AS you walk around the mill, when you ride on street cars, in fact wherever you go, you see the sign "Safety First." The safety spirit is being carried into all lines of shops and factories. Even on street cars, the conductor will not open the door to let you off, until the car has stopped. That is to make it safe for people getting off cars.

This company is spending a lot of money to safeguard its employes, and we do not want any of our men to get hurt, we don't want them to be laid up at home, we need them here. Why do we need them here at the mill? To produce wire and to make money for your pocket book. If you are home, who loses? Your family loses the daily wages you are supposed to bring in. What we really mean by safety is to protect you from all danger.

There is danger in every mill and factory, there is danger in a slight scratch that can turn into blood-poisoning, because men will not report it. I did it years ago, when I was drawing wire. Whenever I ran the point of a wire into my finger, I wouldn't say anything about it to my foreman. But, we don't want that now. We want you to come to the office where we have a bottle of iodine. The application of iodine will smart for a minute, but it will protect you against the wound becoming infected, which is very likely to occur if neglected. Don't be afraid of the boss, but come and let us know about it. If you don't, it may mean that it will keep you from work for three or four weeks and you may lose a finger, or an arm. Then, if we see that the injury is too serious, we have a hospital. The company pays its doctor more money than you or I earn, and we want him to take care of our employes.

The same thing applies to bruises. You smash your finger, you won't say anything for three or four days, and then you come into the office crying "Bola-bola." That means sore finger. You

Digitized by Google

men don't get hell, but I get it, because I don't send you to the doctor, and for that reason I want you to come to me every time you get hurt and let me know about it.

I want to talk on safety in the department next: Every man that works up against a frame knows that there will be something go wrong on that frame at some time. It may be that a bolt is loose out of the treadle and the wire-drawer will not wait for the millwright. He will fix it himself. That is not your business. Report it to the gauger, or to the foreman, as the millwright gets paid for seeing to that work. You get your hand under the frame and are very liable to get your fingers into the gears and probably have your hand taken off. Don't think that you haven't the time to look up the millwright, but get hold of him and have him do it. If you should get hurt in that way, it would mean a loss to your pocket, a loss to your family, and a loss to the company.

In going through the mills daily, I have noticed that a wire-drawer will come along, take the draw-bar, grip the end and the wire breaks. Then he gets mad, swears at the wire and at the diemaker because the die isn't right, and takes the wire and throws it out. You do it lots of times. I want to tell you not to do it, because you don't know who may be walking along the floor. I wouldn't want to walk around with only one eye, and I know you don't because there are times when we ought to have four eyes. Don't throw things. It is too dangerous and you have scrap boxes for that purpose. Don't get mad at anything like that. I always feel that if I get mad, I only have to get over it again. Always put it into your scrap box, then afterward, the scrap man will come around and take it away. In throwing a piece of wire, the ends are very liable to catch a fellow in the eye. Then, supposing the floor wheeler is coming along and steps on that piece of scrap, it goes through his shoe and injures his foot. He doesn't want to go home and the next day he has blood-poisoning.

Now, if there is anything wrong on the frames, report it to your foreman at once, because the foreman cannot watch your frame. You know when the frame is all right, and you know when it needs fixing, but the foreman doesn't know it and if you will say something about it, we will have it fixed at once, or as soon as we can. I would rather see six to ten men go home during the day, than to have one man hurt that day. To show you what this means: Say we have 1,650 employes. Each one of the 1,650 employes loses one day due to an accident, that means 1,650 days lost in one year for the employes and for the company. Isn't that an awful lot? Now some of these injured workmen have to stay home two weeks; so you can see how much that amounts to in a year. We want every man to be careful.

You have noticed that the foremen are bringing in new men. You know that some of the men are quitting. You see new men in the department. The foreman gets the men at the gate. He hasn't the time to watch one of these men all of the time, so he puts him in charge of a good man. He tells John, or Joe, to teach the new man to be a wire-drawer. He places confidence in John or Joe to teach him the art of wire-drawing. Sometimes, we don't get the right kind of a man for the job. We want the man, who is breaking in a new man, to go to his foreman, if the new man isn't making good, if he is clumsy and slow, or if he does not try, and tell his foreman that the man doesn't make a wire-drawer, or a wheeler. You are the ones that must watch that, because the foreman cannot watch it all of the time. He has too many men to watch. He must also watch his orders and see that your work is laid out for you. Watch these things very carefully, and then if the man doesn't make good, we will put him in a different position, where he is not so liable to get hurt.

On your way, coming to work, or during noon, we know that you men may meet a couple of fellow-workmen or friends, and they will say, "Where are you going," "Oh, I'm going to work." They will say "Come in and have a drink." Sometimes you have six. Then you are not right to go to your work. Sometimes you see a man who is not looking right, as if he were not in fit

Digitized by Google

condition for his work. If I were working next to a man of that kind and he was the best wire-drawer in the mill, and I did not think he was able to stay at his work, because he had liquor in him, I would report him. You know yourself that when a man has a number of drinks in him, he is likely to get caught on the blocks and be cut to pieces with all the safety appliances we have here. Would it be that man's fault? I say "No. The man didn't know any better." It was the man's fault who did not report to the foreman.

Suggestion Boxes: What is it that hangs over there at the Die Room? It is a wooden box. That wooden box is a Safety Suggestion Box, which means that we have cards in there and whenever you see anything in the department, we want you—everyone of you—to make use of these cards. Probably you have noticed a broken plate and you reported it to your foreman, but he hasn't paid any attention to it. Take out one of these cards and write down "No. 12 frame—broken plate, must be repaired." You say, you cannot write English. Go to your foreman or any one of the gaugers. They will be glad to write it down for you, and then it will be repaired. I would like to get a pack like that (a thickness of about two inches) every week in this department. I want to have the best department in this mill. If you fellows won't fight for things, we won't get them. I want you to keep after me on these safety things, all the time.

You see men walking around the mill wearing buttons like this one (illustrating). That is a safety button and in order to give one of you one of those buttons, we go through the mill and pick out a man to be a safety inspector from among the workmen. This workmen goes around the mill—at present we have a man from the Mattress Wire Department. He inspects the different departments to find out whether there is anything wrong, anything dangerous. If you know of anything wrong, tell him about it. For that service, he gets one of those buttons. Every man who has been on a safety committee gets one of those buttons. You want to show him that you are a safety man. We want everybody to be a safety man—not only the man who is doing the inspecting, but every workman. The man that can get the most suggestions is the best safety inspector.

When you go back to your work, feel as though it were your duty to tell your foreman every time there is anything wrong. I would have you men complain to me every time you see something dangerous, then if anything happens to that man, he will get me into trouble. In the same way with my gaugers and assistant foremen—it is up to them to help me.

Another thing: Here in the mill you have a job that you cannot work with your Sunday clothes, but we want you to come to work neat and clean. I have seen men who make good wages, who would not think anything of spending a dollar for drink, who come to work in ragged clothing. They don't think how easy it is for their ragged clothing to get caught in the machinery and pull them on top of the frame. A torn sleeve, hanging down, can quickly get caught on a block and break the man's arm.

We had a case, the other day, in No. 1 mill. I told that man if he didn't wear a new pair of overalls the next day, he would be let out, and the next day he had on a new pair of overalls.

We don't want you men to come in with your Sunday clothes, but we want you to be neat and clean about your work.

The same thing applies to your shoes. Men wear shoes that are full of holes. We know an old pair of shoes is easy on the feet, especially if a man has corns, but I am talking about shoes that are all torn and full of holes. In walking along the floor, the ends of wire lying on the floor will go right into his foot when there is a hole, but if there is leather, it will not enter the shoe. I have corns and, when I buy shoes, I always buy them a half size large so they will be easy on my feet. There is no excuse for wearing shoes that are torn and full of holes just to have them feel easy for your corns.

Our company sells shoes for $2.40 a pair and they are good serviceable shoes. Try them out. You don't have to pay

Digitized by Google

for them until pay-day. When pay-day comes what they cost is taken out of your wages. That is cheaper than going to a shoemaker and buying any old shoe.

We are going to have these safety meetings right along, and the next time I won't do all the talking. At the next meeting, I am going to pick out five or six men and ask them to make speeches. The same thing with the foremen and the gaugers. Some fellows say they can't talk like Mr. Koenig. I'll call on Joe to talk in Polish, Mike to talk in Bohemian and John to talk in German. I will give you all a chance.

That is all. When you go back to your work practice "Safety First," if you see anything wrong report it.

Ideas of New York Firemen

Award of Administration Medal Brings Out Valuable Suggestions for Improving the Uniformed Service

FIRE COMMISSIONER ADAMSON of New York City, awarded recently to Battalion Chief George J. Kuss, the Administration Medal of the fire department, given to the one who makes the best suggestion for improving the uniformed service during the year. This is the second year of the Administration Medal, originally established by the commissioner to stimulate suggestions on the part of the members of the uniformed force. The medal has accomplished this object.

During the year just closed the fire commissioner has been deluged with excellent ideas. A number of these suggestions are of a most practical character. Chief Kuss obtained his medal for suggesting an educational feature in the fire department whereby the present lectures given in the fire college to officers only could be extended throughout the force.

A suggestion of great value was made by the Chief of Construction and Repairs to Apparatus, Chas. S. Demarest, and had reference to the installation on Blackwell's Island of a pumping outfit which would give the island excellent fire protection, increasing the service of water to 3,000 gallons per minute instead of the 500 gallons per minute now prevailing. Fire protection on the island has depended hitherto entirely upon fire boats. The engineering features of Chief Demarest's proposal were simple, and the cost of installing the service comparatively small.

A number of firemen did not confine their thoughts to one idea, but made several suggestions:

Fireman Joseph L. Flannery, among other things, proposed that enamel signs be placed on each fire alarm box lamppost, showing the nearest other box in case one of the boxes was out of order; that theaters should be classified in accordance with their fireproof conditions; that a system of flashes or gongs be placed in hazardous fire zones to notify officers of the fire department in case there was more than one fire in the district.

Engineer Peter Brennan proposed an improvement on fire alarm boxes, so that the lettering on the boxes would be in two languages, and that cards should be distributed giving careful fire alarm box instructions. In view of the fact that the fire commissioner has recently placed special emphasis on "How to ring in a fire alarm," Engineer Brennan's idea was timely.

Another fireman who made a number of suggestions was Robert J. Evans, of Engine Company 248. Most of his suggestions were of a more or less technical kind, but among other things he proposed that the fire limits be extended to cover all sections of the city and that private hydrants be

Digitized by Google

painted the same as public ones. In order to add to the comfort of the firemen he proposed that the heavy blue flannel shirts now worn be dispensed with.

Battalion Chief C. C. Schlottmann among other things proposed that the arms of theater seats should be made to rise and lower with the seats, and that all firemen should receive instruction as to the construction of buildings, position of exits, etc.; also that members of the fire department should be furnished with booklets containing maps of the city showing street fire alarm boxes, etc.

Deputy Chief Thomas R. Langford and Capt. Chas. W. Rankin made valuable suggestions as to the means of extinguishing fires and saving lives in case of a fire in the subway tubes under the East River and the Hudson River.

Fireman John J. Schoppmeyer, of Hook and Ladder 22 proposed that the owners of all buildings be directed to place cards in their premises showing the location of the nearest fire alarm box; while Lieutenant Peter E. Costello suggested that printed cards with "Fire Dont's" on them be hung in the hallways of all dwellings, and that these cards contain information as to "How to ring in fire alarms," the location of the boxes, etc.

Fireman Charles E. McCormick devoted most of his time to thinking of ways to improve the safety of public schools. Among other things he proposed the organization of a Junior Fire Prevention League; also that fire drill systems should be devised for the needs of each particular school, and that pupils of public schools should be enlisted as junior fire wardens and be required to report to company commanders.

The placing of a pulmotor in a fire house at Rockaway Beach so that bathers could be resuscitated, was a suggestion put forward by Engineer Charles Funk of Engine Co. 268.

That gongs should be placed at points where there is heavy traffic to warn people of the approach of fire apparatus was one of the suggestions put forward by Capt. Henry F. Shanahan, Engine Co. 156. He also suggested that the front doors of engine houses should be sliding automatic ones.

Fireman George Dorr of Engine Co. 6 suggested that there should be a medical kit in all company quarters to be used for "first aid" to injured firemen.

In order to give firemen more extensive experience than they receive at present, Capt. Anthony J. Stewart proposed that each member of a company should be transferred yearly for eight years until he had served in all the divisions of the Fire Department.

Capt. Chas. E. Field, who last year helped to inaugurate the calisthenic drills, made certain proposals for the improvement of those exercises.

Owing to the large number of fires along the waterfront and on shipboard during recent times, two members of the fire department proposed that fire companies near shipping be provided with Blaugas torches, similar to those used by the Rescue Squad. This suggestion was made both by Captain Frank J. McGarry and Engineer Harry Knapp.

In order to minimize the dangers of fire on elevated lines and in the subway, Lieut. James J. Melia suggested that there should be emergency fire fighting equipment placed both in the elevated trains and on subway cars.

With a view to educating the public as to ringing in fire alarms, Fireman Martin Hannon proposed that motion picture houses should display films showing how to send in a fire alarm. It might be mentioned that Fire Commissioner Adamson carried out this idea practically during the present year.

A large number of the suggestions made to the fire commissioner were of a highly technical character and had to do with disciplinary matters and the better operation of the fire department.

The giving of the Administration Medal has brought out into the open a large amount of latent talent in the fire department, and encouraged men who would never have come forward under the old system, to devote themselves to bettering the service in which they are engaged. The second year of the Administration Medal has more than justified the giving of this reward on the part of the fire commissioner.

Digitized by Google

The following members of the uniformed force, in addition to the ones mentioned above, are considered by the commissioner entitled to special mention for the excellence of their suggestions:

Fireman first grade, Max C. Benisch, and Lieutenant Edward Gallagher: Suggestion as to college course for firemen.

Captain Ferdinand Butenschoen: Signal for fire drills.

Fireman Geo. E. Green: Idea to facilitate building inspections by firemen.

Fireman Kurt Fuchey: Provide engine houses with maps showing location of all alarm boxes, railroad lines, etc.

Fireman James J. Hart: Paint standpipe and sprinkler equipments in different colors.

Lieut. C. A. Hofmann: Ladders leading to scuttles in roofs to open scuttles automatically.

Lieut. Chas. A. Barnes: Searchlight and fire alarm signal system in Harlem River tubes.

Fireman Wm. H. Vette: Cards in different languages with information as to location and operation of alarm boxes.

Fireman Robt. O. Bernitt: Automatic self-raising seats in theaters, etc.

Fireman Andrew F. Lilly: Improvement for monthly inspection of chimneys.

Lieut. Peter E. Costello: Distribution of literature on fire prevention and fire drills.

Capt. Edwin A. A. Quinn: Card system for inspections and violations.

Fireman James Hanley: Distribution of application for permits by company commanders.

Fireman Austin J. Gibbons: First grade firemen to attend fire colleges.

Engineer Geo. H. Greis: Improvement in engineer service.

Fireman John W. Powers: Improvement in summer clothing for firemen.

Lieut. Leon Howard: Service certificates to be issued in place of badges.

Fireman John J. McCarthy: Special calls for fires in underground railways.

Fireman Frank J. Roche: Physical examination for candidates for automobile school.

Fireman Geo. Schulz: Motor apparatus instruction for probationers.

Fireman James J. Hennessy: Military organization for parades, etc.

Capt. Walter Jones: Instruction in company quarters for operating fire alarms.

Lieut. James Brown: Improvement in efficiency in apparatus in high pressure zone.

Fireman John W. Murphy: School for applicants for position of engineer of steamer.

Fireman Edw. F. Mullally: Daily instruction to firemen.

Fireman Chas. J. Lazzaro: Eyesight examination.

Capt. John Conway: Change of hours in daily drill.

Fireman Thos. H. Malkin: Improvement in rescue squad equipment.

Fireman Frank Wintrich: Electric lanterns to replace kerosene.

Fireman Carl A. Montelin: Chimney sweeping outfit for all companies.

Fireman Frank L. Nicholson: Light draught fire boat for shallow waters.

Battalion Chief Thos. F. Dougherty: Improvement in hose nozzles.

Fireman Edw. A. Davenal: Improvement in lamps on apparatus.

Fireman Geo. J. Baum: Improvement in equipment of apparatus, etc.; also medical kit for drivers and special instruction as to care of injured horses.

Deputy Chief Patrick Maher (winner of last year's Administration Medal): Summer clothing improvement.

Fireman Edw. C. Parry: Improvements in motor apparatus.

Fireman Wm. A. Stack: Improvements in fire alarm instructions.

Fireman John E. Moore: Improvements in apparatus.

Fireman John Snyder: Summer uniform improvements.

Capt. John A. Slowey: Improvements in instructions as to fire alarm boxes in buildings.

Fireman Albert E. Guinness: Improvements in summer uniforms; also special badge for house watchman.

Fireman James Hanley: Improvement in signaling system and alarm boxes.

Fireman Frank Brownley: Emergency telegraph system.

Fireman John J. Tobin: Signs for disabled alarm boxes.

Fireman Frank B. Hader: Improvement in electrical equipment.

Digitized by Google

Reflectors at Corners or Crossings

A SAFETY ENGINEERING subscriber writes:

"Please inform me where information may be obtained regarding the use of mirrors or other reflectors at corners or crossings for the guidance of traffic. A problem has arisen at the factory of the Spreckels Sugar Co., your subscribers here, to safely direct vehicles along a rather narrow road passing between buildings and making a right angle turn. Experiments with a small mirror lead us to believe that the scheme is practical and surer than gongs, in that a reflector will better reveal the approach of other vehicles or pedestrians and allow safe passing or turnouts. It is said that such a device is in use in some cities."

So far as SAFETY ENGINEERING is able to ascertain, mirrors or other forms of reflectors at corners or crossings are not in use at present in any of the principal cities of the United States, although large reflecting mirrors have been erected on dangerous curves on the main highways in several States. This practice is believed to have originated in Pennsylvania, where several mirrors have been erected on the Lincoln Highway, and are said to be of much service in the way of safety.

Two mirrors of the foregoing description are located along the Lincoln Highway near Bedford, Pa. An engineer familiar with this installation says: "These mirrors would be very effective, if the automobilist would run slow, but on account of their location and the rate of speed at which a driver makes the turn, he is really making the turn before he can get a view of what is reflected in the mirror. I think mirrors would be a splendid proposition where there is slow traffic at sharp turns."

On account of the interest manifested by inquiries, SAFETY ENGINEERING will be glad to receive from any of its readers, information regarding the use of mirrors at corners, crossings and dangerous curves.

Dangers of American Chemicals

Factory Insurance Association

THE shortage of dyestuffs and chemicals, due to the European war, has caused a number of concerns in this country to undertake the manufacture of the chemical products which are most in demand. The natural result of inexperienced parties entering an entirely new field of manufacturing enterprise is, in many instances, to produce goods which lack stability in their composition.

While we do not doubt that, as the manufacturers of chemicals obtain more experience, their products will reach the same standards of stability and uniformity possessed by the goods formerly imported, nevertheless, during the experimental period a real fire hazard is introduced in mills using these chemicals, which did not exist under the former conditions of manufacture and use.

We have had several instances of fires originating from the use of American made chemicals and therefore feel that we should call this new hazard to the attention of our policyholders who use dyestuffs and chemicals, and earnestly request them to keep any newly obtained dyes or chemicals in some place where they will not be a menace to the plant and, furthermore, to observe them carefully and frequently for any evidence of heating, decomposition or chemical change of any nature.

We would particularly call attention to sodium sulphide and sulphur black, which we have found to be especially liable to cause trouble.

Digitized by Google

Chemical Paper Making

The Process, Hazards and Precautions to Be Observed

By R. L. Morrow, Compensation Inspection Rating Board, New York.

WHEN an inspector goes into a plant and sees machines of all descriptions performing their work under the guidance of skilled operators, or sees these same men performing certain tasks at the bench, he is able to judge, from a brief survey of the premises and a few well directed questions, just what processes are being carried on. From wide experience with similar plants, the inspector knows how to correctly classify the risk, what hazards are involved in the work and how to advise the assured in the best methods of safeguarding.

But when the same inspector goes into a chemical paper plant, he is confronted by an entirely different proposition. To all appearances, there is not much going on. There are a few men dumping chemicals into large tanks or agitators, some revolving drums and digesters, and an unpleasant odor of some evil smelling gas. The laborers do not know the names of what they are handling, or perhaps they have some local names which are even more misleading. It is "up to the inspector" to find out the processes in detail and to know what hazards are liable to occur, and often, under these conditions, he is "up against it."

What takes place, is, in reality, very simple. A large part of the process consists in preparing the proper liquid for the digesters and reclaiming all the chemicals possible after cooking. The preparation of this "liquor," as it is known, may be carried on by either the sulphite or soda process, the former being the most common and the one which will be described first.

SULPHITE PROCESS.

Logs are cut into two or four foot lengths by chain fed circular saws. The bark is removed in the usual type of barker and the logs fed into a chipper where they are cut into small chips suitable for the digester. The chips are carried on conveyors to the chip loft and from there are dropped into the digesters, where they are covered with liquor, the lid clamped down and steam pressure turned on. After cooking for the required number of hours, a valve is opened and the whole mass is discharged into the blow pits, where the pulp is thoroughly washed.

Certain precautions are necessary when operating digesters and, if these are observed, the inherent hazards in their operation may be largely eliminated. It is most advisable to have a regular inspection by a competent person and a complete report showing condition of lining, shell and all connections. Care should be taken that acid fumes are blown out of the digester before the inspector goes in and that all connections in steam and acid line are closed and locked. It is good practice to have two available exits from a digester room in case the air should become suddenly filled with steam and acid fumes.

The bisulphite liquor used in the digester acts upon the chips during the cook and dissolves the intercellular matter between the fibers, leaving the fibrous product suitable for pulp. The reason for removing the bark from the logs was that, if it were allowed to remain on, it would not be dissolved by the liquor and would cause dirt in the pulp.

The details of liquor making are interesting. Sulphur is burned in a retort furnace, either of a stationary type or slowly rotating on trunnions driven by gears or sprockets and chains. The gas produced is sulphurous acid, a colorless, pungent, suffocating gas, which, when kept from moisture, is inert. However, it combines readily with water and then becomes active, attacking and corroding all metals, except lead.

Traces of sulphurous acid gas are in the atmosphere around every sulphite mill and any break in the piping will cause a considerable increase, so much so, in fact, that it may become a source

Digitized by Google

of danger. Even in small quantities, the gas when inhaled causes an irritation of the mucous membrane of the throat which, if continued, will make one apt to take cold and will eventually lead to a permanent cough or bronchitis. The opinion of eminent authorities seems to differ on just what effect certain percentages in the air do have on human beings, one authority claiming that 4 per cent has no permanent ill effect, while another claims that one-tenth of that amount causes difficulty of breathing. In any case, any abnormal amount of the gas in the air should be watched for and, if found, the necessary precautions taken to stop whatever leak may be causing the trouble and improve the ventilation.

The hot sulphurous gas from the sulphur burners is led through the cooler where its temperature is reduced. The gas is then piped over to the tanks of slacked lime where another chemical change takes place, the net result of which is to produce bisulphite liquor. Common practice is to have a series of agitator tanks located on different floors of the building. Sulphurous gas enters the lowest tank, is drawn through this to the next, and so on through the various tanks. The slacked lime enters the top tank, is agitated and mixed with the ascending gas, flows down to the next tank and so on. The rich bisulphite liquor is drawn off from the lowest tank.

The liquor may be made in another way, that is, by allowing the sulphurous gas to flow through an "acid tower." This consists of a high tower filled with pieces of limestone and up through which the gas flows and over which water is sprayed, the final product being as before—bisulphite liquor. The handling of limestone involves considerable hazard because the tower is high and all the stone must be elevated to the charging level. There is danger of dropping pieces of stone off the elevator or bucket on to the heads of those below, also because of the great weight of the stone and the corrosive chemical action, the tower, support and foundation may become unsafe.

In blowing off the digesters, it should be noted where the operator stands to open the valve. The valve stem should be extended through the wall of the blow pit room to an adjacent room or the floor above so that, in case any break occurs, the operator will not be exposed to the escaping steam and acid fumes. Of course, after a blow off, there will necessarily be a certain amount of gas in the blow pit room and digester tower, but this can be prevented to a large extent by having all gas pipes and ducts good and tight.

The usual precautions are to be observed throughout the acid making department; all gears, shafting, and belts being guarded, walks being provided with railings, and toe boards and covers provided for charging openings.

The lighting should be carefully considered as it is often dark in the blow pit room, and many accidents may be traced to insufficient illumination.

SODA PROCESS.

The wood is prepared in much the same way as before, viz., sawing, barking and chipping. Poplar is often used, also pine, spruce and hemlock.

The "liquor" used in the digester is the alkali, caustic soda. When in the concentrated form it rapidly eats away clothing, skin, hair or any part of the body with which it comes in contact.

The digester itself is a steel shell unlined and of the welded type. The reason for using a welded digester is because soda liquor has a peculiar property of working its way through seams of joints which would ordinarily be watertight. Chips are fed in the digester covered with alkali and high pressure live steam turned on, the cooking pressure is maintained for about eight hours more or less. After this, the blow off valve is opened and the whole mass shot out into the blow pits. These are a series of iron tanks with false bottoms, where the pulp is thoroughly washed, the waste water or black liquor contains soda with which the organic acids are combined and which it is important to recover. To do this, the liquor is first concentrated by pumping through a multi-effect evaporator. This consists essentially of a series of pipes within which a vacuum is maintained and into which the liquor is sprayed, the pipes being heated externally

Digitized by Google

by steam or open fire so that rapid evaporation is effected, reducing the weak liquor to a tarry black fluid. This is forced over to a rotary furnace. It consists of an iron drum, revolving on trunnions, at one end of which is a stationary furnace. The highly concentrated liquor being admitted at one end of the drum and the furnace flame shooting out over it carbonizes the liquor and burns it, forming what is known as black ash. To this is added fresh soda ash and the whole thrown into a mixing tank, lime is added and, as the paddles revolve, a chemical reaction takes place, which produces caustic soda and a precipitate of lime mud. The caustic soda is then drawn off and is ready to again use in the digester. In this way, the quantity of fresh soda ash required is very small. Formerly, the waste liquors were discharged in streams, not only polluting, but causing an economic loss of great value. Soda recovered varies from 60 to 90 per cent.

The machinery used is simple and easily guarded. The rotary furnace should have gears, shafts, sprockets and chains guarded in an approved manner. Agitator tanks should have beveled gears, shaft and belt guarded, and the tops provided with standard covers. Conveyors, pumps, engines, etc., should be guarded as usual.

Value of Accident Prevention Activities

THE distribution of costs of industrial accidents is a subject of perpetual interest to safety engineers and employers of labor, but in spite of this interest figures are not obtainable for arriving at actual cost in a particular plant in a large majority of cases, and it is a rare case when complete, intelligent statistics are available. But for the benefit of those who have not given every consideration to the problem, it may be well to assume some hypothetical accidents under certain assumed conditions, and thereby arrive at the laws governing accident costs by the inductive method.

The value of accident prevention work is not truly expressed by savings in insurance premiums. Insurance saving is one item in the total value which is very tangible and paid in advance. The other two items of prime importance are less tangible but of equal or greater importance. Their intangibility causes them to be overlooked by many employers of labor. These two items may be termed "Saving to employer" and "Saving to employe."

The cost of accidents to employers over and above the compensation insurance premium is similar to the cost of "hiring and firing." When any employe, who has been trained to do a certain thing in the plant, is absent from his post of duty for any reason, his employer loses money through expense in training some one else to do those duties, through idle equipment, through time and material wasted by the novice. This fact is so well established, that we merely mention it in passing and quote from one authority who states that the average cost of "hiring and firing" for several thousand cases investigated is $40 per man. For our hypothetical cases we are assuming that this cost is equally distributed over the first four weeks of the new employe.

The cost of accidents to employe we assume to be only the difference between compensation paid him, and the salary he would have received had he continued to work at the same wages over the period of disability.

We are assuming that the accidents herein referred to are total disabilities to a man earning $20 per week in wages, and whose labor earns $20 per week for his employer.

We are assuming that the compensation act covering him provides for the payment of fifty per cent of his wages by the employer, for a period beginning two weeks after the accident, and continuing during the period of disability with an arbitrary maximum of $5000 for any one accident.

The cost of medical attention has been

Digitized by Google

omitted for the purpose of simplifying figures. The compensation risk has been underwritten.

Period of Disability Weeks	Wages lost by employe	Compensation paid to employe or loss to underwriter	Net loss to employe	Loss to Employer
1	$20	$00	$20	$10
2	40	00	40	20
3	60	10	50	30
4	80	20	60	40
5	100	30	70	40
6	120	40	80	40
8	160	60	100	40
10	200	80	120	40
20	400	180	220	40
Permanent	Unknown	5000	Unknown	40

From this table it is plain that in all cases the employe has the largest share in total losses due to accidents, that for short periods of disability the employer takes next largest share, and underwriter has the smallest loss of all. The average period of disability for all accidents is short, but it will be noticed that if the period of disability is two weeks or less, the employer bears one-third the loss, and the employe two-thirds the loss; for a period of four weeks the employer bears one-third, the employe one-half, and the underwriter one-sixth; and for a period of six weeks the employer bears one-fourth, the employe one-half, and the underwriter one-fourth the total loss.

For the purpose of establishing an approximate value for accident prevention work, let us assume that underwriters pay actual value for removal of physical hazards, that by adjusting their total premium on the merit-rating plan from basic rates, they increase or reduce losses paid on account of the physical conditions, by the same amount, then we can use premium adjustments as the basis for determining total value of accident prevention activities.

Taking the average period for disabilities as 6 weeks, which gives conservative results, we may conclude that generally speaking the money invested in accident prevention pays dividends to employers equal to twice the insurance adjustment allowed therefor, and pays the same dividend to the employes, or that the insurance adjustments probably represent one-fourth the annual savings resulting from accident prevention activities, which savings are equally distributed between the employers and the employes.

Factory Inspection Service on Fire Hose

AN illustration of the character of Underwriters' Laboratories' service of inspection at factories and labeling of fire and safety appliances is afforded by the record of this service in some of the factories making hose for fire department use. In an eastern hose factory where the label service has been in operation under the present management of the New York office of the Laboratories for the last four and a half years, about 3,000,000 feet of hose has been inspected and tested during the period mentioned, and for this entire product there has never been a length of inspected and labeled hose returned because of defects which it is the function of the Laboratories' inspectors to discover and have corrected. This record is to be taken not only as an evidence of the thoroughness of the inspection work, but also as an indication of co-operation with the Laboratories on the part of manufacturers interested in the maintenance of suitable standards of safety.

Digitized by Google

Refrigerating Plant Explosion

Explosion in a Refrigerating Plant in Brooklyn, July 13. Photograph taken about two hours after the explosion, at which time the bodies of five persons killed were still under the debris. In addition to five killed, eleven persons were injured.

FIVE persons were killed and 11 were injured, July 13, when an ammonia plant in the butcher shop of Martin M. Schmidt, 422 Sumner avenue, Brooklyn, exploded at 10:15 a. m. The explosion wrecked the building, a 4-story structure. Injured and dead were buried under the debris. The proprietor, 3 employes and 1 customer were killed. Most of the persons injured were passengers in a passing trolley car. The coroner, who investigated the accident, learned that for several days ammonia fumes had been escaping from the plant. The coroner was of the opinion that the explosion was caused by a leak in the gas pipe supplying an engine which was used in the refrigerating plant. He learned that workmen had been engaged to repair the leak. As all who were in the building at the time of the explosion were killed, definite explanation of the accident could not be obtained. The noise and shock of the explosion were terrific, covering an area of several blocks. Witnesses assert that the building was lifted from its foundations, apparently intact, to a height of two stories, then went to pieces completely and rained back into the cellar, the debris spilling across the car tracks in Summer avenue and piling to the second story against the wall of the house adjoining.

In the January, 1912, number of SAFETY ENGINEERING the various causes of explosions in ammonia plants were discussed in a report by the New York Board of Fire Underwriters.

Digitized by Google

Safety in Foundries

Safety First

I am a common laborer.
My hands must earn my living.
I must protect my hands.

TRIMMERS

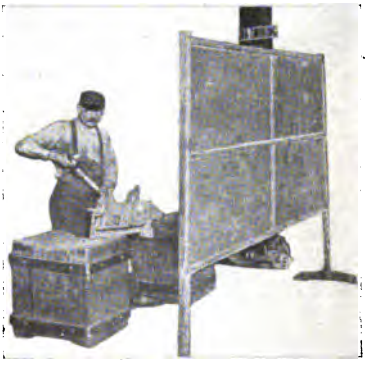
Goggles, hand leathers and screens—but they spell safety, efficiency and economy.

Emery Wheels

SAFE WHEELS AND SAFETY MEN

The grinders are shown at work on two emery wheels operated from the same stand. They are wearing goggles and leather aprons. A canvas guard between the wheels protects the men from sparks and flying particles. Wheel guards and exhaust pipes are shown. This is a Safety First Foundry.

Pneumatic Chipping



The operator of the pneumatic hammer is executing his work with a feeling of confidence. He is in little danger of injury.

Safety First is the order of the day—and is enforced.

The Foundry Section of the National Safety Council has published recently eight bulletins of which four are given above. The Foundry Section is carrying on a vigorous membership campaign.

Digitized by Google

EDITORIAL

Planning School Buildings for Safety

WILLIAM B. ITTNER, architect of the Board of Education, St. Louis, Mo., who addressed the National Fire Protection Association on "Planning School Buildings for Safety," was introduced by Robert D. Kohn of New York, former president of the association, as "a remarkable man, who has not only built safe schoolhouses, but very beautiful schoolhouses." Mr. Ittner said that in its fundamentals, the safe school building will not vary much from any well constructed building built for the housing of people, as the same principles governing good sound construction should be applicable to both. School buildings, however, on account of the youth and inexperience of their occupants and the consequent tendency to panic upon the slightest provocation, involve problems in plan, arrangement and construction encountered in no other type of building. He said that the best authorities agree that there should be no fire escapes on the ideal school building, but that ample and well located inside stairways are the proper means of emptying school buildings promptly and safely. School buildings should be fireproof when funds will permit. The building should be low, under all circumstances, preferably not more than two stories above the basement. After citing examples of good school construction in Europe and in the United States, Mr. Ittner offered as his conclusion, that a school plan which involves correct principles of natural lighting, sanitation and hygiene must by the very nature of such a plan be reasonably safe in its general arrangement. All that remains then is the intelligent application of modern fire prevention methods.

A British Preference for "Is It Safe?"

THE London Omnibus Company proposes a British improvement on the American phrase, "Safety First." It prefers the phrase, "Is It Safe?" The British critic is of the opinion that it is better, in a moment of peril, for one to have in his mind the question, "Is It Safe?" than the commandment, "Safety First." We cannot agree with the British view. An interrogative frame of mind is an unsafe frame of mind. One interrogatory may be the parent of too many others. If one asks himself, "Is it safe?" his mind may proceed to consider what course of action is safe, safer or safest. Before his deliberation is concluded, an approaching omnibus may crush him. Rules of conduct that are prescribed and imperative call only for a single idea—to do the thing that is commanded, without hesitation or question. On a canal, the cry "Low Bridge" means that it is time to duck and duck quickly. It is not an invitation to stretch one's neck upward in a skeptical way and ask, "Is the bridge really low?" On the whole, we must approve the wisdom of the Lord in laying down his law in commandments and not in the form of questions. One cannot find a single interrogation mark in the whole Decalogue. "Thou shalt not kill!" is stronger than "Is it right to kill?" What is good style for the moral law is good style for the safety law.

Digitized by Google

Elevator Hazards and Their Elimination

By R. W. Hicks, Jr., M. E.

A lecture before the Lewis Institute, Chicago, under the auspices of the National Safety Council.

THE term elevator as used herein may be interpreted to mean a means of vertical transportation of passengers and freight, consisting of hoisting mechanism attached by cables or chains to a car which moves in guides in a substantially vertical direction, this definition eliminating belt and bucket conveyors and other forms of mechanism designed to raise materials in a continuous stream. It is also intended to eliminate dumbwaiters and package elevators of a size or design which prevents the operator from entering the car. It includes such elevators as one finds installed in hotels, apartments, office buildings, lofts, warehouses and manufacturing establishments. Classifying the included elevators according to the service for which they are intended the following definitions apply:

A passenger elevator is an elevator used primarily for carrying passengers.

A freight elevator is an elevator used primarily for carrying freight.

A service elevator is an elevator used intermittently or simultaneously for carrying passengers and freight.

It is necessary also to consider the power used for raising and lowering the load and for that purpose we must bear in mind at least two types of elevators in common use today, the hydraulic and the electric, with which many of you are more or less familiar. We may neglect steam and belted types because of their limited use today, also because of their similarity in many ways to one of the two more common types, with the full realization that in so doing we are omitting some inherent hazards that are not common to other types.

ELEVATOR HAZARDS

Passing from elevators to hazards we can make chronological classifications of these hazards, which will be indicated by the terms manufacturing hazards, installation hazards and operation hazards. Using the process of elimination we arrive at the title, Operation Hazards of Hydraulic and Electric Passenger and Freight Elevators and Their Elimination, which more clearly indicates the subject with which we are confronted.

STATISTICS

It will be interesting here to note some elevator accident figures to determine the value of these hazards, and what the causes or contributing causes of former accidents were, in order that we may better anticipate accidents and remove the hazards which cause them. In Chicago, for instance, the coroner reported:

38 fatalities in 1911
44 fatalities in 1912
40 fatalities in 1913
38 fatalities in 1914

due to elevator operation. That is an average of 40 persons a year killed in Chicago alone, almost one a week. Analysis of accident records shows that these accidents and many other elevator accidents are composed principally of incidental accidents, rather than catastrophies. That is to say, most people are hurt or killed by some unsafe method which they pursue, or by some minor defect in the equipment; rarely does a defect develop in the essential parts of the mechanism which

Digitized by Google

results in a large number of deaths at one time. This condition is not an accidental result from unknown causes. It is a direct result of elevator engineering and many years of practical experience. Elevator manufacturers have long realized that, in order for elevators to be practical, elevator service must be safe, or at least must not be spectacularly dangerous, and to meet this public demand some of them supplied enough safety to avoid calamities, or at least enough to make calamities remote. But this is not sufficient, elevators have come to be a necessity in certain locations, due to congestion of industrial, mercantile and social activities, and therefore, the thousands of persons who are dependent on elevators for vertical transportation, and who are employed to operate and maintain elevators, have a right to assume that with elevators, as well as other common carriers, all necessary provisions have been made for their safety.

PRINCIPLES

You have already been introduced to safety engineering and know something about how safety principles are being incorporated in the design of machine tools, shop equipment, shop methods. You have seen "Safety First" signs used profusely and sometimes promiscuously and here I would state that, while signs are essential to the advertising of a new product or a new movement, signs alone do not provide positive universal safety. Accidents are the results of hazards, and hazards are faults in men, methods or materials. The elimination of hazards is the elimination of these faults. Ignorance on the part of an elevator operator is a hazard to be eliminated by education and instruction. Faulty materials in car, shaft or hoisting mechanism are hazards to be eliminated by proper materials. Unsafe practices and methods of operation are hazards to be eliminated by omission entirely of the function, or if the function is necessary, by the substitution of another method that is safer and easier than the old method.

These evolutions or transformations in men, methods and materials are applications of safety principles, which are now being rapidly standardized. There are, of course, misapplications of principles which have brought forth severe criticism and, in some cases, ridicule; but we must expect some misapplications, on account of the newness of the field and correct them when we encounter them. With elevator equipment, our great safety principle is that each and every piece of that equipment must offer the highest possible degree of safety to all persons who are in any way affected by its presence. The second is that safety must not be used instead of art and efficiency, but must be combined with art and efficiency in such a way as to be always present and at the same time to gain favor with the artist, the efficiency engineer and the public. But in gaining this favor, the application of the principles must provide protection from physical, mental and moral accident hazards.

ELEVATOR HAZARD ELIMINATION

Let us assume, therefore, a typical elevator installation of modern type and look for points that might be improved in such a way as to reduce incidental accident hazards without interfering with efficiency of operation and at the same time outline the general requirements of elevator equipment, in so far as they relate to mechanical features and physical hazards.

MACHINE

Starting with the machine which consists of sheaves, cables and some mechanism for transforming the energy as received to controllable tension in the cables. All parts of this machine should be designed and constructed to give strength, durability and reliability, by embodying ample factors of safety based on the car loaded to capacity, with due consideration for the physical properties of material employed and the nature of the loads encountered.

If the machine is overhead, it should be supported on a strong frame with

Digitized by Google

a continuous, level floor surrounding all parts that require oiling or adjusting.

The room containing the machine should be well lighted and ventilated, regardless of location. Darkness breeds filth and interferes with good housekeeping. This requirement is too often neglected.

This room should be provided with an effective lock and kept locked at all times against all unauthorized persons.

If the machine is electrically operated all switches, panelboards and current carrying parts should be enclosed in grounded metal cases to effectively prevent the accidental contact of persons with live parts of the equipment. All wiring, of course, should be thoroughly protected in conformity with the best modern electrical practice.

All revolving parts of the mechanism, especially gears and projecting parts, should be enclosed to prevent accidental contact with, or injury to the oilers, and other maintenance men; these enclosures may be solid sheet metal or expanded or perforated metal, depending on the nature of the hazard. Wooden guards are apt to increase the fire hazard, especially if the elevator is electrically driven. Generally speaking, a metal guard offers superior protection.

In the case of a hydraulic machine provision must be made for renewal and readjustments of valves and proper setting should be maintained at all times. Plunger and valve glands must be kept tight enough to prevent leakage. Creepage is a fault so nearly universally common to hydraulic elevators as be regarded as an inherent hazard, and must always be considered as an important feature in the total accident hazard.

Among the accessories necessary for all types of machines are automatic stops to limit upward and downward motion of the supporting cables and control the source of power.

There should be a reliable governor on all machines to prevent car speeds greater than those for which the car is designed. The impact force of a car stopped suddenly increases with the speed. Essential parts are designed to withstand these loads only at the maximum rated and specified speeds.

For all passenger and freight cars and counterweights, there should be two or more cables of cast steel or soft iron, preferably of a smaller diameter, that is ½-inch to ¾-inch in diameter. These cables should be fastened in a reliable manner to the cars and counterweights. One method which has proven to be reliable employs a conical casting through which the cable is passed, the strands separated, turned in and the remaining space filled with solder. If this method is used, the cable must be carefully "pickled" and cleaned to give the best results.

A new set of cables capable of withstanding a load 10 times as great as that to which it is subjected when the car is loaded to capacity and operated normally is considered sufficient for a large majority of cases.

The minimum diameter of sheave for any cable is given by reliable manufacturers and these sizes should, in all cases, be adhered to, smaller sheaves often causing rapid deterioration of the cable. In general, the ratio of the diameter of the sheave to the diameter of the cable should be about 60 to 1. Variations therefrom depend on the number and size of strands in the cable and material of which they are made; in other words, on flexibility and elasticity of the cable.

The size and shape of grooves for different cables is a prime factor in the design of the sheave; if the cable binds, natural rotation is prevented and internal strains are introduced which sometimes result in a broken cable. These grooves do not always retain their original shape under operation. The cable sometimes cuts the groove to a new shape and the groove sometimes cuts the cable, depending on comparative hardness. Either condition requires the attention of a trained attendant, and should, in no case, be allowed to exist until a critical condition appears. External vigilance by frequent inspections, regrooving the sheaves and removal of

Digitized by Google

cables before they reach a dangerous condition is the price of cable safety.

SHAFT

There should always be a shaft enclosed in fire retarding partitions with doors over all openings that are suitable for stopping persons and fire from passing through the opening.

The absence of an enclosed shaft has caused many serious and fatal accidents. It is common practice in too many places to install freight elevators without a shaft of any kind. Too much cannot be said against this practice. There also are elevator installations where the hatchway openings are partially enclosed by a fence, and there are hatchways with automatic trap doors, and still other combinations of protective devices which are compromises between minimum and maximum protection. The shaft has been recognized as a necessity to protect crowds and prevent catastrophes for a long time, but its restricted use, which is largely confined to passenger elevators, would indicate that this measure has been considered extravagant where only one or a few persons are exposed to the hazard.

No doubt, the hazards of open hatchways are more serious on passenger elevators than on freight, the hazard being proportional to number of users, but nevertheless, they are serious enough in the case of freight elevators in this day of workmen's compensation, and should be eliminated by use of standard shafts and doors in all cases.

Open hatchways or shafts enclosed by flammable partitions are a menace in so far as the fire hazard to property is concerned, but an open hatchway is a far more serious hazard to persons than to property, because fire is one of the hazards to life; the same fire that destroys property may also destroy life, and in addition to the fire hazard to persons, there is the danger of any occupant on any floor taking a fatal fall through the floor opening; and there is also the danger of shearing between landing and car floor.

SMOOTH SHAFT

Now with the shaft enclosed in fire resisting walls, there must be a door at each floor. This door, as previously stated, should offer a high resistance to heat transmission and should be easily and safely operable. The door should not overhang into the shaft nor should any other projection extend into the shaft, especially where the sides of the car are metal. For this purpose a metal horizontal sliding door offers more desirable features than any other type, and furthermore, allows the elevator to be used as an emergency exit in cases of panic.

The same degree of perfection in lighting and ventilating should be attained at elevator landings that is applied throughout the building.

Special attention should be given to the anti-slip properties and smoothness of the floors and door saddles, and to provide a suitable surface, some special material such as cork tiling or an approved tread should be provided. Slipping and tripping accidents are numerous and often serious. The coroner of New York attributes more deaths to the slipping and tripping hazards than to all the transportation lines and fires in that city, during the same period of time.

Every elevator landing should be marked plainly with the word elevator at a place visible to the largest number of people, and this sign should be illuminated, naturally or artificially, at all times when the building is occupied. This is especially important when the stair shaft is adjacent to the elevator shaft. The sign should be of white letters on a green field, if the elevator is suitable for emergency exit.

A signaling system with an indicator at each landing, which shows at a glance the position of the car and the direction of travel, has a desirable psychological effect on the public, and should always be included in a standard elevator equipment.

CAR

The construction of the shaft and landings are of great importance but

Digitized by Google

no more so than the car, and every precaution should be taken to insure safe entrance to, occupation of, and exit from the elevator car. It should, of course, be strong and durable with a large factor of safety over its rated capacity, which should be as large as the car would be called on to withstand under heavy loading.

The car should have one compartment and one entrance only, except in very rare instances. The use of freight or service cars suspended below the usual passenger car is dangerous and inefficient. Two entrances to the car are used in too many cases; in most cases the condition could and should be improved by adjusting the plan or rearranging partitions. The one opening should be in easy access, and in front of the elevator operator, when he is occupying his normal position. This opening in the car should be protected by a gate and the gate should be used especially on express elevators and all crowded cars. This gate may be provided with an interlock and so arranged that it must be closed before the car is started, but it would probably reduce the elevator efficiency to a large extent in many instances. The other sides of the car not used for entrance and exit should be permanently enclosed by solid partitions or so nearly solid that fingers could not protrude through the openings and come in contact with stationary objects or objects moving in the opposite direction, such as counterweights and beams.

The floors should be smooth and free from obstructions, splinters, slippery spots and should be maintained in this condition at all times, in spite of water and oil that may be brought in. Wood and cork tile serve this purpose well in most cases, except at places where wear is concentrated.

The car enclosure should be at least 6 feet high or to the top of the car with provisions made for good ventilation. The top should be covered to protect passengers and operator from falling objects of all kinds that sometimes get into a shaft; a solid top will also keep oil from sheaves or overhead machinery from falling on passengers and the floor, but sometimes it interferes with good ventilation.

The car should be well lighted with a lamp designed to prevent flying glass. All unnecessary glass, such as mirrors or windows should be omitted entirely.

In some cases, a special threshold light, operating automatically when the car starts or stops, can be used to advantage, but this should not obstruct the opening nor increase the tripping hazard.

Every car should have posted therein a sign stating maximum capacity of that car; these figures should be of sufficient size and so located with respect to the floor and the lamp that all may read.

There are two ways of controlling a car, by a shipper rope and by a lever. Both electric and hydraulic equipment may use either method of control but with hydraulic installations, if a lever is used, it usually acts on the shipper rope which controls the pilot valve. Generally speaking, the later installations of passenger elevators use lever control, the other method being adaptable only to slow speed cars (less than 150 feet a minute).

A shipper rope should be maintained as carefully as the main cables for while not subjected to severe strains, a damaged shipper rope may become a serious hazard. If it breaks, under certain conditions, the car will travel to a limit stop at full speed or if some of the strands of a steel rope break, it may cause painful lacerations to operators or occupants of the car.

A shipper rope is of itself a hazard if the elevator runs through the hatchways or partially enclosed shafts, in that anybody on any floor can move the rope from the floor and start the car. This may occur in such a way that the operator who is on or near the car, and who is reasonably sure that the car is where he left it, becomes a victim of contributory negligence. When the hazard exists and an enclosed shaft is not obtainable, a very simple and efficient lock can be installed in such a way as to eliminate

Digitized by Google

a large percentage of the hazard. The lock most commonly used consists of a set of buttons which are permanently fastened on the shipper rope at each landing, and a lock-head permanently fastened to the car platform. The lock-head contains jaws and a handle for operating the jaws. To operate a car with this device, you simply hold the jaws open by means of the handle and shift your shipper rope in the proper direction; to stop the car release the handle, the jaws engage the next button, stop the car at the landing and lock it at that floor, so that it can only be moved again from the platform of the car.

With lever controlled cars, we have new conditions and new hazards. To begin with, a hand operated shipper rope is impractical on high speed cars, and some express elevators run at speeds as high as 700 feet a minute and have power enough to accelerate very rapidly, and a hand operated shipper rope should never be used on cars traveling faster than 150 feet a minute, and even then the operator should use a glove or shield or a mechanical device as described above for its manipulation, to protect his hands.

A lever control is, therefore, used on all high speed and many low speed elevators. The lever should be located near the car door, and preferably swing in a plane parallel to the shaft door. It should be so designed that it returns to a neutral position whenever the hand is removed therefrom. In addition to these requirements, the elevator should be so arranged that it cannot be moved while a shaft door is open. This is generally accomplished by a mechanical interlock, operating in such a way as to lock the lever in neutral or by an electrical system, which opens the control circuit when any shaft door is opened.

INTERLOCKS

This requirement is mentioned here because of the two classes of interlocks now on the market. Both affect the normal operation of the lever, or the function of the operating lever. For the purpose of discussion, we will call these two classes mechanical and electrical interlocks. The object of all these interlocks is to prevent elevator accidents caused by shaft doors being open, when car is not at the landing and motion of the car before the shaft door is closed and locked. It is estimated by various authorities that 80 per cent to 90 per cent of all passenger elevator accidents are due to those two causes and that from 60 per cent to 85 per cent of all elevator accidents are due to the same cause. Whatever the percentage, the hazard is very important and has been recognized by our legislative bodies, as evidenced by legislation to the effect that it is unlawful for an operator to move his car from a floor until the shaft door has been closed and locked. But if we consider that the authority to issue such an order involved the responsibility to see that it is properly executed, there was little authority for the issuance of such an ordinance by legislative bodies. The nature of the hazard required physical improvement in equipment, so that the natural demand for a positive mechanism to regulate the situation has been supplied by inventors, and placed on the market in commercial form by many individuals.

The mechanical devices consist of a mechanism at each landing, part on the door and part on the door frame and another on the car so arranged that when a car stops at a landing with the control lever in a neutral position the shoes on one piece of mechanism engage with the other mechanism in such a way as to unlock the door and allow the shaft door to be opened; when the shaft door is opened this motion is transferred through a system of linkage to an engaging arm of some kind that locks the control lever in the neutral position. The closing and locking of the shaft door in turn unlocks the control lever so that the car is again operable. When it leaves the landing, the shoes disengage and leave the door locked, thereby preventing an open or unlocked shaft door after car is gone, and making it impossible to move a car from

Digitized by Google

a landing until the door is closed and locked, incidentally regulating the accuracy of car level with respect to the landing within a predetermined limit.

The electrical devices consist of a number of door switches which are installed in series with the control lever switch in the car. These switches are mounted on the door jamb and are opened by action of the door, or of a self-contained spring, when the door is opened by hand.

When any one of these switches is opened, the control lever may be moved either way without causing any current to flow in the motor, therefore, preventing any motion from being transmitted to the car. This arrangement, however, necessitates the use of another emergency switch for short circuiting the whole system in cases of emergency. For instance, if someone were to pick the lock on a shaft door and open the door while the car was between landings, the car would stop. In a case of this kind, an emergency switch relieves the situation, and allows the car to travel in spite of the emergency and gives the operator a chance to choose the lesser of two evils—of being stuck in a shaft or operating without the door interlocking mechanism. It also happens that firemen sometimes use the elevator and shaft for carrying hose lines to upper floors and in these cases it is necessary that the doors be opened while the car is in motion. In putting in an emergency switch of this kind, which defeats the purpose of the other equipment, some way for controlling the use of the switch must be provided. A replaceable glass disc which, when broken, allows the emergency switch to operate seems to supply the necessary means for a building superintendent to keep check on this item.

You can see, however, by considering the different uses to which elevators are put and the different conditions which exist at each installation how each installation becomes a problem in itself and how elevator engineering becomes a branch of sufficient importance to justify specialists, and how the field can be covered only by broad safety principles, which depend on numerous conditions for the interpretation and application of these principles.

OPERATOR

In elevator practice, as in other practices of safety engineering, the most effective safeguard any man can have is a thorough knowledge of existing hazards and how to avoid them. Once this knowledge is obtained, it must be kept alert and applied. It, therefore, becomes necessary to supplement all safeguards with knowledge. Elevators are no exception to the rule. Someone should be placed in charge of a battery of elevators who is thoroughly familiar with the function of all parts of the equipment, the inherent and incidental hazards; and this person, in turn, should apply his knowledge directly or through his subordinates, in such a way that all parts are, at all time, maintained in a safe operating condition. He should instruct the operator in safe methods of operating his car, teach him the value of the parts embodied in the design, the dangerous limits of certain practices, what to do in cases of emergency. He should supplement these instructions with a system for keeping check on the operators, so that he might be better prepared to know comparative value of the operators. Such plans have been successfully operated where there are a large number of elevators in a battery.

But where only one or two elevators are under the control of a management, the plan should be modified or altered to fit the condition so that the operators are directly responsible to a reliable person. And in this connection, it would be hardly fair to drop the question without paying tribute to the elevator boy, who has been the hero of so many fires through his continued efforts to remove other people to safety.

Regardless of number or location of elevators (except that type known as automatic elevators, which is purposely omitted) each should have one

Digitized by Google

trained operator to operate, giving all or part of his time to that duty, and it should not be left free to anyone.

Remember that after all possible automatic and mechanical safety is provided, it is impossible to ignore the human equation, and that universal safety can only come through supplementing perfect equipment with perfect knowledge and conduct.

National Safety Congress, 1916

Exposition of Safety Equipment, Under the Auspices of the National Safety Council, a New Feature

THE National Safety Council was organized in New York in September, 1913, under the name of The National Council for Industrial Safety and was dedicated to the proposition of promoting the conservation of human life and its incidents in the nation's industries.

At the time the National Safety Council was formed, the movement to prevent accidents and safeguard industrial workers was making steady strides and a need existed for the men engaged in accident prevention work to have a clearing house for exchanging experiences, to furnish one another information helpful in their work.

The National Safety Council has met this need successfully and its annual congress is the most notable event of the year in the industrial accident prevention field.

The rapid growth of the National Safety Council has been accomplished through the co-operation of its members and committees and other adherents. The keynote of the National Safety Council is "Service." Its foundation is "Practical Knowledge." Its motive is the "Welfare of Humanity."

When the headquarters of the council were opened in Chicago for active work in October, 1913, there was a membership nucleus of forty. At this time (July, 1916), the membership has risen to 2,100, distributed throughout the United States, Canada, Mexico, England, Australia, Chile, Japan, Hawaii and Roumania.

Over 150 different industries are represented in this membership—also all of the leading steam and electric transportation companies, and insurance companies, insurance brokers and agents. Many associations, chambers of commerce, and State and national organizations are included also. Twenty-three local councils have been established in various cities.

To effectively deal with the accident prevention problems of special industries, the following sectional organizations have been established, and others are being added:

Building Contractors.
Electric Railways.
Governmental.
Iron and Steel Manufacturers.
Mining.
Paper and Pulp.
Public Utilities.
Textiles.
Chemical.
Foundry.
Health Service.
Laundry.
Packing House.
Public Safety.
Railroad.
Woodworking.

Some of these sections have already issued special sectional bulletins, and these are being distributed weekly to the members affiliated with such sections, in addition to the routine, general safety poster service of the National Safety Council. Other sections are to follow a like procedure.

The council, through its information bureau, is answering every working day of the year, questions put to it by members about their own specific accident prevention problems. This aspect of its facilities is a most efficient complement to its routine and sectional weekly bulletin service.

There were present, at the third an-

Digitized by Google

nual congress, Chicago, 1914, 950 persons and at the fourth congress, Philadelphia, 1,500. It is estimated that, at the fifth annual congress, to be held in Detroit, October 17-20, there will be an attendance of 3,500. The increasing attendance at each of the congresses is evidence of the increasing interest in the council's work and in the welfare of the cause for which the organization stands. New memberships are now reaching the council's headquarters at an average rate of five a day.

That the National Safety Council is meeting with great success is clearly shown by the above figures. The president, vice-presidents, executive committee, as well as the members of all other committees, give their services and experience in accident prevention to the council without charge. It has the cooperative assistance of the best safety engineers of the United States.

Any person, firm, corporation or organization interested in promoting the cause of safety may become a member of the National Safety Council. There are three classes of membership: honorary, active and associate. Honorary members pay no dues.

FIRST EXHIBIT OF SAFETY EQUIPMENT AT THE NATIONAL SAFETY CONGRESS.

An important feature is to be added to the 1916 congress. The National Safety Council has authorized, under its auspices, an exhibit of safeguards, safety devices and equipment to be held in the armory, Detroit, October 16 to 20, inclusive. This furnishes an opportunity to those who attend the congress to inspect a comprehensive collection of devices used in the industries today for safeguarding life and property. It also furnishes, to manufacturers of these devices, an opportunity to show the merits of their products and explain their uses. The mechanical safeguards are an absolute necessity in preventing accidents and safety officials spend a considerable amount of their time in removing, as far as possible, dangerous conditions to workmen, through the installation of safety devices.

The practice of accident prevention consists of:

1. Educating the men and securing their belief and support in safety efforts.
2. Removing dangers, as far as possible, through safeguarding.

It would appear that the National Safety Council, by providing a safety exhibit at its congress, furnishes both these necessities—the congress being devoted to educational features and the exhibit to the mechanical needs.

The managers of the commercial safety exhibit report that manufacturers of safeguards are enthusiastic about this new feature of the congress and the space available is fast being taken up.

The safety exhibit furnishes an opportunity for safety officials to take groups of their men and explain to them the different devices. This should stimulate the men in safety work and also cement their faith in the advantages to be secured from the use of such devices. The human element is an important feature in preventing accidents. Strange as it may seem, workmen at times take a dislike to the installation of safety devices on machinery. It is necessary to carefully explain the dangers which threaten them and how mechanical safeguards diminish those dangers. Men who have been accustomed to work for years without safeguards and have been fortunate enough not to have been injured sometimes get the idea that they never will be injured and that safeguards are unnecessary. A little education and explanation at the safety exhibit will be helpful in such cases.

The inclusion of a safety exhibit at the National Safety Congress, 1916, should prove a great success and all manufacturers of safety devices should exhibit, thereby furnishing a representative collection of the mechanical safeguards with which all progressive safety engineers should be acquainted.

Digitized by Google

United States Steel Corporation's Work in Accident Prevention

By Charles L. Close

Manager Bureau of Safety, Relief, Sanitation and Welfare

THE history of the accident prevention movement, and the part played by the Steel Corporation in it, is more or less generally known, but I cannot resist putting considerable emphasis on just what to my mind made this movement so successful in the Steel Corporation and why it has spread to practically all lines of industry. It is humanitarian, of course, and it was from this standpoint solely that the work was inaugurated and when men of the type of Judge Gary, Mr. Farrell and Mr. Bolling, as well as other officials of the Corporation, with the many serious problems of a large corporation on their minds, give time and thought to the discussion of preventing accidents, backed up by approving the expenditure of large sums of money, the effect it has on the whole general movement cannot be passed over too lightly. Plant managers, superintendents and foremen, who questioned the expenditure of large sums of money for safety devices, or the giving up of some of their time for discussing safety problems instead of getting out tonnage, and who had not yet come to believe but that accidents were inevitable, were told that the Steel Corporation's policy was to prevent accidents regardless of cost. It did not take them long to discover that appropriation requests for accident prevention work were being freely granted, and usually without question, by the officials of the Corporation.

In asking for money for some plant improvement, they endeavored to put the request on the grounds of safety, where if the request were based solely on plant improvement, it might be questioned, especially if times were hard and it was necessary to practice economy. This is probably telling tales out of school, but it is merely to show how effective this support on the part of the Steel Corporation officials was to the movement. Expenditures totalling over $5,000,000 have been approved for safety work since 1906; this was the year when the Steel Corporation itself actively took up the work and decided to assist the subsidiary companies by doing everything in its power to reduce to a minimum the misery and suffering among its employes due to accidental injury. To say that the officials of the Corporation are pleased with the results obtained by the subsidiary companies through this safety campaign is putting it too mildly.

Aside from reducing the number of accidents to about one-half of what they were in 1906, it has brought about a splendid spirit of co-operation and good feeling among the employes. Instead of 4,929 men being seriously injured or killed in 1915, which would have happened had the 1906 rate continued, there were but 2,784. This means a saving from serious and fatal accidents of 2,145 men, a total saving of 14,967 in 9 years. One subsidiary company alone, with its largest operation in Pennsylvania and an average number of employes in the neighborhood of 18,000, had but 526 lost time accidents in 1915, against 5,135 in 1907.

The average person believes that the steel industry is more hazardous than any other, when in fact statistics show that there are other lines of work that are more dangerous. Persons employed in agricultural pursuits are more liable to injury than those

Digitized by Google

working in the steel industry. To be sure, this industry has claimed its toll in accidents, but not to a greater extent than any other. Through modern methods of communication, the public hears of accidents where the men have been burned by molten metal. These accidents, of course, are due almost entirely to the hazards of the industry, but compared with the total the number is small.

In a study of the causes of 100,708 accidents, which have happened in the Steel Corporation companies, it is found that but 4.08 per cent were due to hot metal, flue dust or flames, which might be considered entirely distinctive in the steel industry and not peculiar to all industries.

Nearly one-half, or 44.93 per cent of these accidents were attributed to hand labor, one-third of which were due to material falling. The conditions under which these accidents happen are almost wholly within the control of the workmen and must be attributed largely to carelessness or thoughtlessness on their part. Another class of accidents coming under the division of hand labor are those in connection with the use of sledges, hammers, hatchets and hand tools; 7.38 per cent of 100,708 accidents were recorded in this class. In addition to these hand labor accidents which, according to the classification itself, indicate that they are due to carelessness, there are hundreds of accidents classified under other causes where the employes' carelessness or thoughtlessness contributed to them. In carefully analyzing the causes of any 100 accidents it will be found that at least 90 of them could have been prevented had some one exercised a little more care.

The total number of accidents associated with machinery causes, excepting those in connection with overhead electric cranes, amounted to but 5.13 per cent. No doubt, this very low percentage is due to the protection afforded by the application of mechanical safeguards as installed by the subsidiary companies. The accidents represented by this percentage do not indicate, however, that the machines were not properly guarded, for employes do get hurt even though the machines have been completely equipped with safety devices.

Other facts which are interesting are, that of 100,708 accidents, but 82 occurred in or around boilers; only 51 were charged to excavating (and here most of the labor is foreign), while but .68 per cent were due to electric shocks, other than from cranes. All accidents in connection with overhead cranes, including shocks and handling material, were but 3.08 per cent of the whole. Evidence of the workmen's carelessness can be had from the following figures: 7.8 per cent of these same 100,708 accidents were due to falls; of this number, 61 per cent happened from falls on the ground level and not from ladders, scaffolds and stairways where some protective device might be installed.

It will be seen by the figures quoted that mechanical safeguards do not play the important part in accident prevention work as is supposed. While the guarding of all machinery is essential and is just as important as any other phase of the work, still, more accidents happen where the conditions are entirely within the control of the workmen themselves, and which can be charged to carelessness or thoughtlessness on their part, than those directly due to machinery causes.

Carelessness and "chance-taking" go hand in hand and while the employe himself is the cause of most of the accidents, the employer must accept his share of the responsibility. "Chance-taking" by the workmen has come to be considered a necessary qualification in holding a position, but this is one of the things the employer must try to correct. As an illustration, go into any railroad yard, even today, after some eight years of educational work in accident prevention, and I will venture to say that you will see a switchman stand in the center of the track and mount the locomotive foot board as it approaches him. He feels that if he does not do this he is not a good railroad man either in his own eyes or in the eyes of his fellow

Digitized by Google

workmen. There are many such unsafe practices in industrial plants.

These we might call characteristics or habits of the present day workmen, to which they have become thoroughly accustomed, and to correct them is like teaching an old dog new tricks. By a persistent campaign of education we can do a great deal and these careless acts will gradually lessen, although many of them will never be corrected until this generation has been supplanted by a generation of workmen who have acquired the habit of doing their work in a safe manner.

The Steel Corporation's activities to educate the workmen in safe practices leads in many directions, the most important of which, is in enlisting their individual help by placing them upon Safety Committees. Through this they realize the sincerity of the company in its efforts to prevent them from being injured and appreciate the foolhardiness of taking chances. It also aids in spreading the safety spirit to the other workmen. Through this system, which has been inaugurated by the Corporation, the subsidiary companies already have had more than 12,000 employes serving on such committees. There are at the present time 4,249 men serving on these committees. In addition, there are over 100 men who spend their entire time in studying accident problems and devising ways and means of preventing them. There are also many other employes who regularly devote a part of their daily work to accident prevention.

We feel that we are bound to get results if we can get everybody thinking "Safety First."

Coke Oven Accidents in 1915

By Albert H. Fay, Bureau of Mines.

REPORTS received from the operators of coke ovens show a gratifying decrease in the number of fatalities and injuries during the year 1915 as compared with 1913 and 1914. The number of men killed in 1915 was 38 as compared with 45 in 1914, and 46 in 1913. The total number of men reported employed for 1915 was 31,060 as compared with 22,313 in 1914. The fatality rate in 1914 was 2.02 per 1,000 while in 1915 it was 1.22. The injury rate in 1914 was 98.10 per 1,000 while in 1915 it was 91.82 per 1,000 men employed. Of the total number of non-fatal injuries, none was reported as causing permanent total disability while 50 were reported as causing permanent partial disability. The report represents 248 plants or companies showing 55,112 ovens in operation as compared with 49,895 in 1914. Some companies rendered combined reports for several plants so the exact number of plants is not known. There were also reported 98 plants idle. The average number of days active in 1915 was 303 as compared with 286 in 1914, and 288 in 1913. Although the accident figures thus collected are not quite complete for the entire industry, yet they are sufficiently representative to point out some of the principal hazards of the industry.

The report gives for the first time separate accident data for beehive and by-product ovens and indicates a greater hazard for the latter than the former.

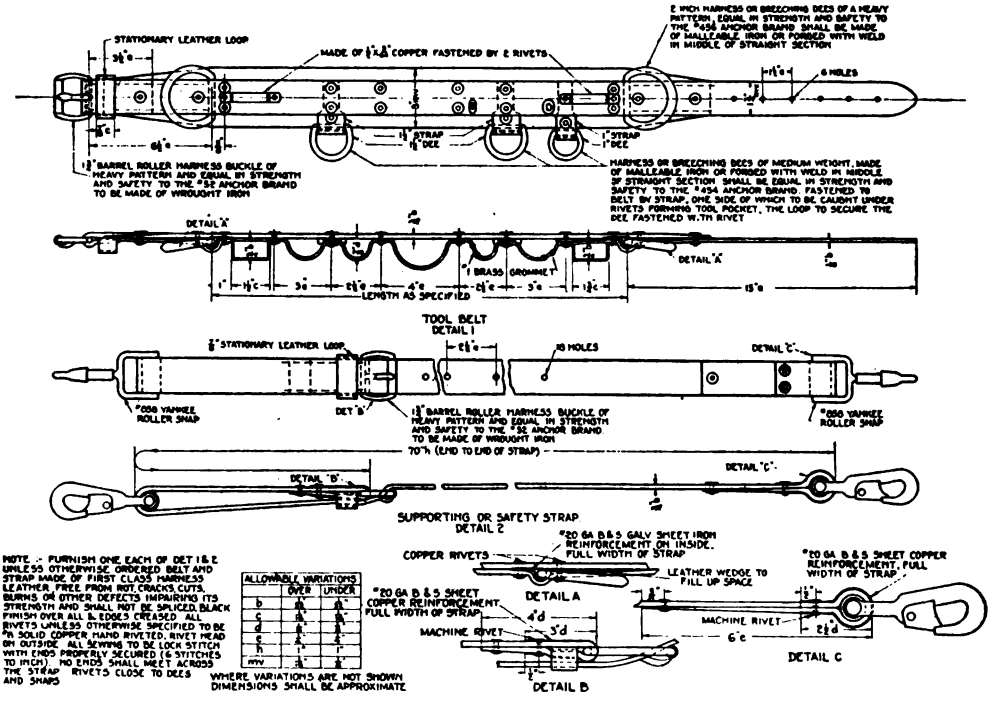
Digitized by Google

Public Utilities Companies

Their Special Problems and Needs in Organizing and Promoting the Work of Accident Prevention

Lineman's Tool Belt and Safety Strap

THE Pacific Telephone and Telegraph Company says that after careful consideration of suggestions from a great many experienced linemen as to tool belts and safety straps it is believed that, for the use of linemen employed in telephone service, a tool belt and safety strap made up in accordance with the specification and design illustrated below and on the following page will be an important factor in promoting "Safety First." SAFETY ENGINEERING is indebted to the Pacific Telephone and Telegraph Company for photographs from which the illustrations have been made. The accident prevention committee of the National Electric Light Association, at the recent convention in Chicago, reported that it had been unable as yet to comply with many requests for a standard specification for a lineman's belt. A standard of this sort is urgently needed, one that will be generally acceptable and insure the necessary safety requirements. The Pacific Company's specifications, also specifications by the Illinois Steel Company, the Public Service Company of Northern Illinois and the New York Edison Company formed a part of the report of the N. E. L. A. committee as being the best specifications brought to its notice for a lineman's belt.



Working Drawing for a Lineman's Belt. Pacific Telephone and Telegraph Company.

Digitized by Google

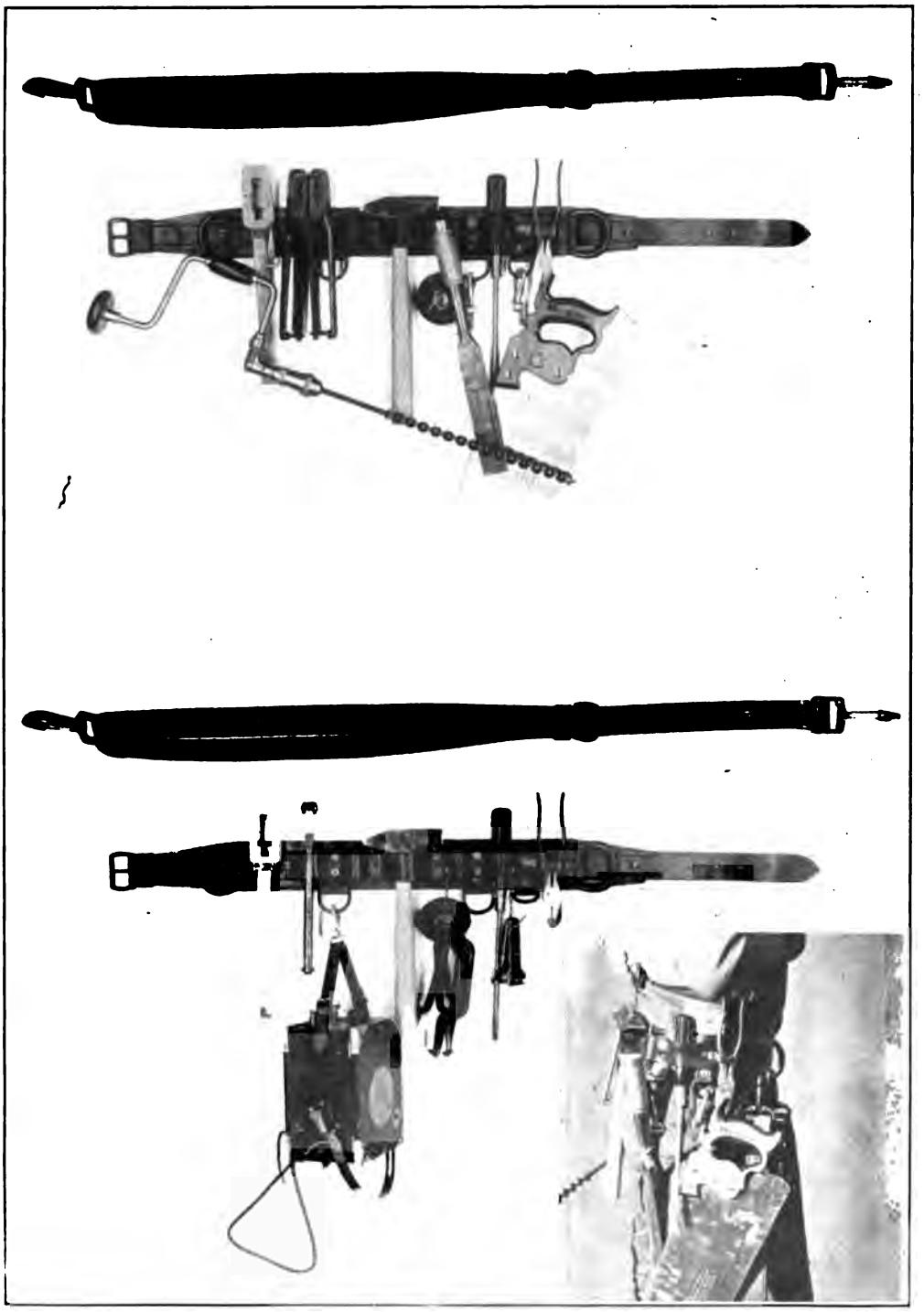


Illustration of Lineman's Belt. Pacific Telephone and Telegraph Company.

Digitized by Google

Typical Accidents Among Public Service Employes

Bureau of Safety, Chicago

CAR CLEANING.—The Cause: The injured, when starting to clean a car, put the pole on the trolley wire to light the car. The controller was left on two points by the motorman, when he left the car for the night. Injured was standing in front of the car and when the pole came in contact with the trolley wire, the car jumped ahead, catching injured between the bumper of the car he was working on and another car on the same track. The Result: Knee badly bruised and sprained. The Remedy: Make sure that the controller is on the off position and always remove the handle before leaving the car.

Track-jack.—The Cause: A crossing was being raised with a jack. A crowbar was being used as a lever. After the raise was made, the lever was left in the jack. Shortly after, the jack dropped a notch and threw the lever upward, striking the trackman under the left eye. The Result: Deep cut on the cheek, just below the eye. The Remedy: Inspect all the jacks carefully. Remove the lever from the jack after the raise has been made.

Handling Tools.—The Cause: While working at a bench, a mechanic struck the back of his hand against the teeth of a handsaw. The Result: Punctured blood vessel on hand. The Remedy: When the tools are not in use, see that they are properly put away. Never have sharp-edged tools lying around carelessly.

Unprotected Holes.—The Cause: An anchor hole had been dug in the yard. A fireman going off duty at midnight fell into the hole. The Result: Ankle severely sprained. The Remedy: A red lantern should be placed at all excavations and openings at night.

Firing Tools.—The Cause: A fireman jerked a hot poker out of the firebox and allowed the hot part to slide into his hands. The Result: Hands and fingers severely burned. The Remedy: When drawing a poker or bar from a fire, do not allow any part of it which has been within the firedoor to slide through the hands. This type of accident is common.

Handling material.—The Cause: Injured was carrying an old work bench down stairway to basement. The Result: Palm of hand was punctured by nail in bench. The Remedy: Before moving any old material, see that all protruding nails are removed or turned down.

"Safety" Decoration for Cars

THE New York State Railways has a committee at work investigating and making experiments with a "Safety First" decoration on some of its trolley cars. The decoration consists of painting the ends of the car below the windows in alternating wide stripes of red and white, the object being to make approaching cars readily distinguishable at a distance.

The innovation originated with Coroner Alfred W. Armstrong of Canandaigua, N. Y., who, in investigating a rear-end collision between a passenger and a work-car on the R. & E. division of the New York State Railways, was impressed by the fact that the cars were painted almost the same color as that of the roadbed. It occurred to Dr. Armstrong that as the motorman from his position looked at the car ahead as it ascended a grade, it would make it much easier to distinguish if the ends at least of the car could be painted a bright color to contrast with the landscape.

It has usually been the custom for railway and public service companies to paint their cars a "Pullman" brown, offering little, if any, contrast to the surroundings, making it exceedingly difficult for motorists and other travelers to distinguish approaching cars.

Digitized by Google

"The Man on the Job"

Prevention of Accidents By Education of Workmen, Methods of Management and Mechanical Safeguards

SAFETY ENGINEERING offers each month one First Prize of $10.00 *and one Second Prize of* $5.00 *for Articles relating to Industrial Accident Prevention. In case of a tie, the full amount of the prize will be paid to each tied contestant.*

SAFETY FROM A NEW ANGLE.

No. 227 —Say, let's have a real safety talk, give it to us straight. We have been trying to get together but we have been fooling each other too long. We have all played the game of "fooling" the other fellow, "shifting the responsibility," etc., until we shall have to be very much in earnest as to our intentions to have any success in meeting and correcting the real fault of the lack of interest in the "Safety First" movement. Life is a gamble after all. The enjoyment is limited to the extent we enjoy the game, the excitement to the limit of the game. The actual results gained depend on the knowledge we have of the game and the judgment we use in playing it.

Regardless of all this, however, whether we are dealt a good hand or a poor hand, we begin the game of bluff. But in the final showdown, the cards speak for themselves and the spoils go to the winning hand.

Mexico is now spelled with a question mark at the end, showing that even the existence of the country of Mexico is questioned—a blot on civilization. A result of ignorance, I say.

Japan, in the life of a young man, has evolved from an ignorant nation to a state of high civilization. Their standing as a power among civilized nations? If an aspirant to the belt in the pugilistic world wants to battle the champion, he is told to "go get a rep." Has Japan the "rep"? Well, there are many thoughtful people who consider Japan of sufficient importance to advise the United States to keep an eye on her.

What brought about the change in Japan? The result of educating the people. Quite a contrast to Mexico where it is said the peon is kept in ignorance.

Now you have the lesson before you. Play the game straight. Learn the game. Prepare for the showdown. Quit fooling each other.

Who are fooling each other? First, the men are attempting to make the company think they are working for the cause of safety and that they are heartily in accord with the movement. At the same time they are withholding important facts. They fail to give their whole-hearted support for fear that information they impart, either by work or action, might be used against them in a claim or lawsuit. Others are afraid they will hurt a certain organization to which they belong. Some are so selfish that rather than save the company money by preventing accidents, they will permit accidents to occur when a word from them would save the injured man many hours of suffering.

You don't believe it? Go among the men and tell some to put their jumpers inside of their overalls, tell them not to wear gloves around the machines and a few other small things. You will almost have a strike on your hands.

On the other hand, we have employers, or rather men representing the employers, who are afraid to educate the men. They say it is a case of educating a man to whip his employer by furnishing him an argument to use in a trial, etc.

It must be admitted that men familiarizing themselves with the protection the law furnishes have been embarrassing to many companies. It must further be admitted that a credit

Digitized by Google

business can never be as cheap as a cash business, as the profits must pay for the dead-beat. Claims must be paid for out of profits and who suffers? Think it over — there is food for thought. Can we men get together on this safety movement?

Bless your heart, it is simplicity itself. Why? It is about the only thing at present that the employe and employer can get together on. Rather, it is a proposition they are absolutely compelled to get together on. Why?

First, a man has nothing to sell except his labor, and if he is injured so as to affect his ability to perform labor, he doesn't sell it. That's plain, is it not?

Second, a corporation must make profits and if they get into court before juries that think the corporation has money to burn, decisions are rendered accordingly. So, if one would avoid claims, he must avoid accidents. That's plain, is it not?

If you have the labor in such condition you cannot sell it, you go hungry. If you make profits and pay it out in claims—get out of business.

You say, "Now that you have given your opinion on an existing condition, what is the remedy?"

My answer is, "Quit your 'foolin'; get down to business." "Get together and avoid injuries." Your profits? Increased demand for your labor—a fair profit for the employer—better citizens, both of you. "Safety First" becomes a realized fact, and not as much abused (as well as unpopular) as the subject of "Efficiency."

❦ ❦ ❦

No. 228 EDUCATING FOR SAFETY.—The "Safety First" movement was at first considered by the workingmen as a nuisance, and the inspector was disliked. Now it is considered necessary in our daily work, and the inspector is regarded as a friend. There are some men who are not as efficient in their work as others, but they are considered first class men in the same line of work. There should be a distinction made between the man who can do and does his work in a safe way and the man who does not. Some men will use precaution in their work when left alone by the foreman while others will not. For this reason each individual should be made to understand that he is responsible for the accidents he may cause.

In our company we are supplied with rubber gloves and rubber coverings called "pigs" to cover the wires. The men are instructed by the inspector, perhaps once a month, and every day by the foreman of the gang, about the use of this protection. After this instruction, which is regular, some of the men still persist in reaching over and crowding through wires without first covering them, when left alone. The answer to this is that they are not educated to the degree of efficiency which will be an important factor in the near future in regard to safety. I mean by this, as the safety movement is new, the men have not received the education that safety first requires.

A man can learn a trade in three years without safety attached to it. With safety added it will take at least two years longer.

❦ ❦ ❦

No. 229 SAFETY EDUCATION FOR THE WORKMEN.—We enter a plant where safety guards and danger signs flash before us at every turn; where sufficient labor is assigned to maintain plant cleanliness and clear gangways; where an efficient safety department is continually delving into the facts and causes of recent accidents, analyzing them and discovering where dangerous conditions may be eliminated that had not presented themselves before. All this caution and system amount to very little if the workmen themselves have not the safety habit thoroughly instilled in them.

We have found that one of the best ways of impressing the workmen with the idea of safety and keeping it constantly before their minds is to interest their wives and daughters in the safety movement, by awarding prizes to the wives and daughters for the best suggestions. We also write per-

Digitized by Google

sonal letters, impressing the workman's family with the fact that an injury to him means a greater loss to his family than to his employers and endeavoring to start the discussion in the home outside of working hours.

In our own experience we rate safety guards and signs as amounting to from 10 to 15 per cent in the elimination of accidents and education as at least 85 per cent. A plant may be guarded in every possible way and yet a man who knows nothing of safety will displace a guard or neglect to replace one, and cause enough damage to offset the cost of every guard in the plant.

Maintaining live and interesting bulletin boards is, of course, one of the best known methods of educating the men; but if these boards are merely filled with pictures of mechanical safeguards, reports of accidents and slogans the men will not be over-apt to read them. By reserving a special space in which to place photographs, clippings and general matters of current interest to the world we find that any number of men stop to read this section of the board and will naturally then take in the balance.

In our safety rule book we have also inserted in the back a section on health and sanitation, which includes in a general way practically all of the common maladies to which the average man is subject. Because of this the man will keep the book constantly in his possession or take it home, showing it to his family, and by this means we are almost assured of his becoming thoroughly conversant with the safety rules as well.

❦ ❦ ❦

No. 230

THINK. — The actual and vital need of men and women of every class is whole and perfect bodies. The risk of human life, because of not believing in a new idea, has been tabooed.

The rapid pace at which we are now traveling, superseding the old, slower methods, brings new problems every day. One of the greatest of these is the prevention of needless accidents. The problem, to a great extent, has been solved and needless accidents are being eliminated by asking and influencing men and women to think.

The prevention of accidents is largely a question of the right mental attitude. In the shop, on the railroad, in the mine, in the store, in the factory, in the counting-room, on the farm, or amid the whirl of mighty mechanism, we must think before attempting to do any piece of work. In casual contact on the busy street, at the social gathering or in the seclusion of the fireside, thinking is necessary for our protection from injury. "Safety First" is only another way of expressing the idea that we may insure our safety by thinking.

At a certain age, the boy attending school begins to yearn for some work for which he will receive immediate and, to his mind, more material returns. First, he is disturbed by the uncertainties as to the vocation he desires to follow. After he has made the selection by choice or necessity, he usually finds that his expectations are disappointing. This abandonment of the pursuit of education, and entrance into industrial or business life very often proves his undoing, by permanently checking his ambitions and enthusiasms, and his hope of success in life.

Only the fittest successfully survive the change and the ordeal. The boy who rises in his new environment, amid the discouraging difficulties, is the one with the keen appreciation of a perfect body and of the importance of constant thoughtfulness applied to his work. Such a youth, grown to manhood, may be required to work at some hazardous occupation. In any event, he will find himself surrounded with the hazards of health, life and limb common to us all.

He should learn to take human nature as he finds it, and, above all, to search for the brightest and best qualities in those with whom he comes in contact, and particularly in his fellow-worker. Good will, charity, and sincerity, characterizing his fellowship with his associates, will do much to make the important step into the work of life success-

Digitized by Google

ful and pleasant from the beginning and will insure his later advancement. This spirit of fellowship is the spirit which prompts the efficient and thinking man to interest himself in the safety and welfare of his fellow-worker. It is the spirit of our industrial life, and has been greatly developed during the last decade by the safety movement.

Observing workers, almost without exception, have witnessed the maiming or death of their associates and know how many times these disasters and their sorrowful results have been caused by the thoughtlessness or wandering mind of the injured victim. The thinking worker soon profits by the observation of these needless accidents and the safety spirit prompts him to become an active agency in his plant; active in the interest of his own safety and active in the interest of the safety of his associates. The man with a family dependent upon him appreciates that the future welfare of his family depends upon perfect health and an uncrippled body more than upon any advancement he may make in his occupation.

A safety organization, so arranged as to give such a man an opportunity to express his opinions of the conservation of health and life, develops within the employes who are members, the disposition to think of their work and their health and courage to express their opinions on the important subject. The success of a safety organization is very largely dependent on the creation of thoughtfulness in the minds of the individuals. The good accomplished by those who strive in the interest and success of the movement is well worth the time spent at the meetings, even though they must leave the family circle for a short time in the evening to attend them.

The present nation-wide interest that is being taken in safety and the gratifying results accomplished are sustaining the opinion that to think first means "Safety First."

The power of thought—careful thinking, will bring to the young man entering his life's career, safety from failure, safety from inefficiency, safety from disability and ofttimes safety from premature death.

No. 231 ONE HUNDRED PER CENT SAFETY.—To tell how to get 100 per cent of safety in a shop or place of employment is not the easiest thing to do. That is, to tell how all accidents can be "cut out" entirely.

Can such a state of perfection really be reached? In some cases it may be for quite a long time, until the personal element creeps in and someone forgets to be careful.

Much machinery can be guarded 100 per cent safe. Belts, gears, pulleys, shafting, some punch press operations, platforms, walks, etc., can be made "foolproof."

It has been often said, and truthfully, that only a small percentage of the accidents of industry can be prevented by mechanical means. How then are we to obtain 100 per cent of safety? Some say it is impossible and others say it can be done. Many firms have proven that a goodly percentage of accidents can be prevented, and in so far as mechanical appliances are concerned, a few have reached 100 per cent of safety for some time past. To raise the "human element" percentage to the 100 mark is a long and tedious task. The problem has been experimented with in various ways. Perhaps more correctly speaking, in the same general way but with different degrees of "punch" behind it; we might say different degrees of sincerity with which the scheme was launched and operated.

In every plant, large or small, there is one fundamental thing. The one thing that underlies every successful effort toward 100 per cent safety is the earnest and determined demand by the owner or the directing power, that accidents be reduced to the minimum. Everything that is good at all cost somebody something. "Someone has to pay the fiddler." If one cannot get the backing and support of the man or men at the top, one might about as well not try, because all the safety one will get is what he can "slip through" and that won't be 100 per cent by a long shot.

Having the "say so" of the management, the assurance that the cost will be paid and returns demanded for the cost, the question is how best to proceed.

Digitized by Google

If the *demand* from the top is handed down without a wink to the superintendents and foremen one is fairly certain of their co-operation, which will be an example to the rest that an undertaking has arisen that must bring results just as surely as the day's work must be done and the products turned out.

The present established methods of reducing accidents are: Educating the employe to select and adopt a safe way of doing things; developing in the employe a desire to see that his fellow-worker is not injured, and the installation and maintenance of well selected and properly built safeguards that are not in the way and really guard.

The method of safeguarding the machinery and dangerous places about a plant is one that can be well taken care of by the mechanical repair department, or, in a small plant, by a good mechanic. However, before a safeguard is made it is well to interest the man or men who are going to use it, in the design thereof, and frequently to have the insurance or State inspector give the benefit of his experience.

The methods of educating employes, foremen, superintendents and management (they all need it) have been so thoroughly and continuously threshed out in the columns of this magazine that to repeat in detail would be taking up valuable space.

For the reader who may be starting a safety organization I would suggest that he get the back numbers of SAFETY ENGINEERING and read the articles in the "Man on the Job" department paying particular attention to those adapted to his plant or industry; considering the size of his plant, hazards of the industry and class of help employed. If a plant is of sufficient size it should have a central committee, workmen's inspection committees, foremen's department reports, first aid hospital and attendant, visiting nurse and shop inspector. Bulletins to circulate among employes, slogans on pay envelopes, bulletin boards in each department using good live bulletins with a "punch" to them are valuable aids, keeping the bulletins up to date by joining the National Safety Council and getting others from insurance companies and State departments. Use signs liberally at conspicuous places. Motion pictures can be used to good advantage and an occasional talk by a good booster. Small plants can use bulletin boards and signs for educational work where there are too few men to have an effective shop organization. The example set by the management in its attitude toward safety and the earnestness shown in the manner in which it safeguards machinery go a long way in the small plant.

We have all seen safety signs and have read about their part in safety work. I have seen cases, visited plants where it appeared that the safety sign was expected to do wonders, even supply the 100 per cent safety. I was in such a plant the other day and in a dark place where a sign could hardly be read was a warning. My first idea was to suggest a light over the sign and to supply the floor, but the floor did not badly need more light. The next idea I had was, why not put a sign there *that would talk?* Who has ever seen signs that talked? One large steel plant has a large sign, electric lighted at night, at the main entrance to the plant. How much does this sign really say after it has been there a while, or the employe has seen it a few times? Would not a talking machine (even in the dark) perform more effectively the work the sign is intended to do? Foreign languages can be drilled into a person's brain by constantly hearing sentences from a phonograph. Why not add to our already efficient safety organization a talking machine here and there to preach safety and boost the present record of 80 per cent up a few notches toward the 100 per cent mark.

Signs will never take the place of safeguards. For example, on the outside of a pump house, at a small station on one of our railroads that has talked much and loudly about its "Safety First," was a sign that read: "'Safety First.' Do not oil or clean machinery when in motion." This railroad has done some excellent work in accident prevention, but it will never get 100 per cent safety by depending on signs. Inside this pumphouse was a stairway to the bottom, about 10 feet below ground. At the foot of the stairs were a gasoline engine, flywheel,

Digitized by Google

gears, crank shaft, key and keyseat, but no guards. Not even a hand rail on one side of the open stairway. Everything inside was "Safety Last." This sign should have read: "Safety First outside of building. Please keep out." Then the door should have been locked and the key thrown down the well.

I have encountered some pretty lukewarm efforts to obtain safety and so has every safety inspector. I will give an example of one of these, which, unless some changes are made in principles and methods, will be a long while getting 100 per cent of safety. In a good sized shop of the same railroad system cited above, was a safety organization. The head of the plant management was chairman of the safety committee, and I believe he really wanted safety in his plant. He was a very busy man, so left it to the rest of the committee and others. I went through with the committee and pointed out a few of the things which might have torn a man to pieces. There was nothing guarded in the place, excepting a rip saw, and the guard for that was hanging on a nearby post. I wondered how anybody could expect that "Safety First" committee's signs, pennants and safety organization were going to build 100 per cent (or even 25 per cent) safety in a plant where a slip, a grab for support, or a push by a jovial fellow-worker would send a man into wide open, dangerous machinery. I hear someone say right now, "Organize and educate your employes not to be jovial workers, or to slip." Don't depend on it quite that far. It's all right to educate. It's great work and it has results, pays dividends. A plant organized for safety in which there are employes who are afraid to say (even if on a committee) that the dangerous machinery should be guarded, or to point out the danger points, will never make a record that amounts to anything. We all have seen such places. If the management wants "Safety First," as a lot of them say they do, it means a liberal allowance, for a time, from the dividend side of the ledger. Don't make a noise about your "Safety First" plant until you have shown that you are really in earnest and will appreciate the co-operation of your employes. Don't try to make your workmen believe that they are entirely to blame for accidents. You can't do it. Don't try to lay it all off on them. They may not say what they think; they may go through all the "stunts" of a safety organization without any more show of interest than they think will hold their jobs. The safety organization that is in earnest from the top down is a wonderful institution and a profitable one to both employer and employe. Some of the profit should go to the equipment of the plant with safeguards that guard, and for praise and reward to the employes who call attention to the hazards and bad practices of the place.

Don't forget to call in the insurance companies and the State inspectors to help you out. Their experience is an asset you can have for the asking. Their business is studying accidents and their prevention, while your safety organization is producing your output. A few lessons now and then with your inspection committee will build up your organization very nicely. The experienced inspector sees how things are done in hundreds of plants. If you can afford it employ such an inspector, but don't shut him up in your plant to get rusty. Let him keep in touch with other plants, doing good work, by actually visiting them.

The first thing to do is to make up your mind whether or not you want: "Safety Last," "Safety Halfway" or "Safety First." Then organize properly. Show your employes you are in earnest by doing the things they think it is necessary to do. Get in the experienced inspector to guide your men. Provide the necessary equipment, first aid, etc. When you make safeguards, make them 100 per cent safe and place them in 100 per cent of the places that are not safe. By that time every employe should be with you, foremen, superintendents and men, all willing and anxious to do their share.

Many employes will read this. I want to say that they have a duty and a part to perform in this work for mutual benefit, and it certainly should be performed: a duty to themselves, their families, the other fellow and his family, and to society in general. Don't think you know

Digitized by Google

it all because you have worked in the shop all your life and something new comes up for your protection. Only too often does the professional inspector, whose business it is to work for the good of the employes as well as the employer, find a man who knocks every effort intended to better his condition. Don't think that somebody is always trying to give you the worst of it. If the organization is well balanced and in earnest, the workers not on the active committee should trust to its members until their turn comes to see and do for themselves.

Prizes for June Articles

First Prize. No. 224. Ralph W. Immel, Timekeeper and Member, Central Safety Committee, Globe Plant, American Smelting & Refining Company, Denver, Colo.

Second Prize. No. 226. W. H. Crumbaker, Assistant Superintendent of Maintenance, Avery Company, Peoria, Ill.

Honorable Mention. No. 225. E. H. Hart, Inspection Department, Ocean Accident & Guarantee Corporation, Dallas, Texas.

Comments by Members of the Committee

My sympathies are with Article No. 224. The importance of a good example is a "well framed" thesis and the subject should be fostered and driven home more often.

I vote for No. 224, "The Importance of a Good Example." The writer has emphasized the fact that a foreman's interest in safety matters is one of the chief factors in the promotion of safety, or, on the other hand, that his lack of interest may prove a retarding factor, for his example is generally followed by his men; that carelessness or inattention to safety precautions is surely a "thorn in the flesh" especially to the safety inspector. It is the opinion of the writer of the article that carelessness might be justly termed laziness, and I agree with him. I think that the sooner safety committees give such fellows to understand that laziness is not wanted in the safety movement, the sooner the cause will advance 50 per cent. for this failing in many a workman—foremen not excepted—has been a greater enemy to "Safety First" than perhaps any other distinguishing feature.

I vote for No. 226. The logic is good. You can not secure any permanent results unless you secure co-operation. This can be secured by the right sort of a man. You can buy safety now if you pay for it in securing the right sort of a safety man.

In my opinion article No. 224 is the best. The importance of a good example cannot be emphasized too much. The writer has treated the subject very well and should have the first prize.

No. 226, I believe, is entitled to first place, for without co-operation the "Safety First" movement must be a failure; but with co-operation on the part of employer, foreman, and The Man On The Job beneficial results will be accomplished.

Please record me as favoring the author of No. 226 for first prize. He taps the main sources of real "Safety First" principles. The objection which working men, especially those who are organized, urge against physical examinations is based on the fear that the employer's sole purpose in such a proceeding is to locate the defectives and dismiss them. From my experience with many large employers, it is only fair to say that

Digitized by Google

the main object in requiring a physical examination of their employes is not to discover and disqualify the deficient (for there are none perfect), but, through the knowledge gained in that way, to assign more intelligently to their workmen the tasks for which their varying physical conditions best fit them. If this purpose was more generally understood, the opposition, even of organized workers, to physical examinations would quickly disappear.

No. 224 is well written and covers the subject thoroughly and I would like to see this article in the hands of every workman.

I vote for No. 225. If the foreman does not take interest in "Safety First," the men under him will surely lose all interest in the safety movement.

Articles Nos. 224 and 225 are very similar and both are very good. I choose No. 225 because I think the writer, while not as fluent, is doing more actual safety work and knows more of the subject than the author of No. 224.

The winner of the second prize for May articles, W. H. Aldrich, writes: "I appreciate your fairness and the courtesy shown me in this and other articles that have been sent you. Of course, I am glad to receive the check but I feel that the greater regard for my feeble efforts is in the publishing of these articles and the reading of the same by your many subscribers. I have the work of accident prevention in heart as well as in mind and my long experience in the field as an inspector, my present position as a superintendent of inspections, together with considerable experience in actual mechanical engineering lines, has helped me to realize the great importance of the educational work primarily necessary in the prevention of accidents. I thoroughly believe in educating the average workman up to a point where he himself will not accept a position unless everything has been done to properly safeguard him."

Sanitary Standard for Bakeries

Adopted by the National Association of Master Bakers.

(1) Building well lighted in every part with natural light, and thoroughly ventilated; air supply kept free from contamination by surface dust.

(2) Floors, walls and ceilings of impervious materials with smooth surfaces and kept clean. Rooms kept free from vermin, screened against flies.

(3) Plumbing, drainage, etc., ample to remove waste and prevent dampness, and kept in good order. Sanitary toilets, shut off entirely from bakeshop and storage room.

(4) A plentiful supply of pure water. Convenient and adequate washstands and supplies.

(5) Garbage, refuse, etc., stored in tightly covered cans and disposed of quickly.

(6) Machinery, tools and other equipment so made, installed and used as to facilitate cleanliness and safety.

(7) Stables to be disinfected and so located as to prevent odors from them reaching the bakery.

(8) Methods of distribution such as to protect bakery products from contamination between the oven and the home.

(9) A health certificate, showing freedom of all employes from skin diseases, tuberculosis, venereal and other contagious diseases. Spitting and the use of tobacco in the bakery prohibited.

(10) Employes of bakeries to be properly clothed in clean, sanitary garments.

Digitized by Google

Safety Rules on the "Erie"

Practices and Methods of Doing Work That Are Forbidden by Charles T. Banks, Safety Supervisor

GOING between or under moving cars or engines.

2. Using hand to open knuckles, foot to line draw bars or kick open knuckles, when an approaching car or engine is nearer than two car lengths from standing car. Undertaking to lift knuckle lock pins by hand while cars are in motion.

3. Coupling onto passenger equipment, sleeping or dining cars, caboose or cars containing live stock, emigrants' movables, boarding cars or cars occupied by employes, such as tool cars, etc., in such a way as to subject occupants to possible injury.

4. Boarding an approaching engine or car from a position between the rails. Boarding the pilot steps of a moving road engine.

5. Boarding moving caboose or passenger train car on front end as it approaches you.

6. Boarding or jumping from rapidly moving cars, train or engine, except to avoid impending accident.

7. Riding on foot-board of engines between engine and cars when such cars are being pushed.

8. Riding on engines (foot-boards, pilots or elsewhere) or on cars or trains in yard by employes whose duties do not require such transportation, unless under permit issued by the superintendent.

9. Riding on deadwoods, draw bars, brake beams, grab irons, hand holds, brake staffs, ladder or any other appurtenances on the facing end of cars, while such cars are being pushed.

10. Riding on the ends of loads when such loads are liable to shift from impact of coupling, when slack runs out, or by ordinary train movement.

11. Riding on pilots of engine between stations by trainmen either on duty or deadheading.

12. Entering upon repair tracks, coupling to or moving cars thereon, before the car inspector's signals have been removed by the authorized person and in addition thereto, obtaining a repair track release order completely and properly executed.

13. Switching or coupling onto trains or cars, or giving signal to move trains or cars which display car inspector's signals, irrespective as to what tracks trains or cars are on, until such signals have been removed by authorized person.

14. Giving signal to move an engine or cars and then running across track in front of such engine or cars with less than two car lengths leeway.

15. Giving signal to move engine or cars without first placing switch in proper position for the movement.

16. Switching or handling any class of occupied passenger equipment without cutting in and testing air brakes; the test to consist of a service application before moving.

17. Standing on wrong side of pole when staking out a car. Always follow the pole.

18. At stations where highway crossings are not protected by flagmen or gates; pushing cars ahead of engines over such highway crossings, without first protecting crossing; yardmen or trainmen to proceed on foot over crossing, looking in both directions and making sure that persons and traffic have been stopped before giving signal to engineman to proceed. Light switch engines engaged in yard work to follow the same practice.

19. Throwing coal, slag, clinkers or any other object from moving train or engines or engines standing still without first looking to see that no one will be struck by the object thrown.

20. On double, three or more tracks—standing or walking on track while a train is approaching or passing on opposite track; also standing too close to tracks when trains are approaching or passing.

21. Leaving stepping boxes in aisles

Digitized by Google

or vestibules where passengers may stumble over them.

22. Allowing bulky packages, suit cases, etc., liable to jar or fall down, in parcel racks in coaches.

23. Standing near or on extreme end of freight cars and giving go-ahead signal when there is sufficient slack in train to throw you off car.

READING NEWSPAPERS ON ENGINES.—Enginemen who read newspapers while they are on their engines, no matter whether they are on a side track, engine lead or other track with engine standing still, are not carrying out the principles of safety or efficiency. These men are on duty just the same as though they were riding 60 miles per hour between stations. Unexpected necessity for quick action on their part should always be anticipated and they should be ready at all times to act immediately on signals. Officers and members of safety committees are charged with the duty of seeing that the practice is abandoned.

THE YOUNG EMPLOYE.—When you follow the rules in doing your work you are establishing a reputation for good service, that means a better job, promotion over the man who is careless and a promise of a long life. *Start being a real man.*

SHOW US SOMETHING.—Fill out card form 4032 whenever you find old draft rigging, knuckles, brake beams, track material or other stuff in yards where it is likely to trip you down. Don't compound dangerous conditions by not making a report of them. Tell the superintendent. He wants to know!

"GETTING IN BAD."—Members of safety committees—and every employe should consider himself a "safety committee of one"—would report lots more unsafe things if they didn't still have that old idea that they would "get in bad" or get somebody else "in bad." There's nothing to it at all. You'll never "get in bad" nor get anyone else "in bad" by reporting unsafe conditions or practices.

"CALL HIM DOWN."—When you see a man do a careless thing *"call him down"* and don't be afraid of hurting his feelings. The careless man who does things in an unsafe way is a menace to his fellow employes as well as himself. In two months 75 employes were injured through the carelessness of their fellow employes. Dereliction of duty caused 29 accidents.

THERE'S A SAFE WAY TO DO IT.—Do it that way! Start now! When you notice unsafe things, or something that should be fixed, report it to your superintendent. He will do the rest. Every injury, no matter of what character, must be reported to your superintendent on the date on which it occurred. Going to the company doctor for treatment is not reporting the accident in accordance with this rule.

GETTING ON AND OFF MOVING TRAINS.—Injuries due to trainmen getting on or off moving trains or engines are increasing. This is a violation of Safety Rule No. 6. Engineers are not giving sufficient attention to this matter. Better judgment must be exercised and speed regulated to the safety of the men who are required to get on trains or to drop off. Train and yardmen are instructed to report engineers who fail to exercise such judgment in order that officers may take steps to stop the practice.

THE BIG ACCIDENTS.—All of the serious railroad accidents the past year were caused by *Man Failure.* The automatic signals, roadbed and equipment were all right, everything that money could do to safeguard the operation of trains had been done, everything in the way of rules and instructions had been covered, so the railroad had done its part. Why didn't the employes do theirs?

SMOKING ON DUTY.—The additional time necessary to do work the safe way, such as making dead stops before opening knuckles, lining draw bars, lifting knuckle pin by hand, uncoupling air hose, passing in front of moving engines to operate switches or pass signals, and most other unsafe, dangerous practices is less than the time used to take your pipe and tobacco out of your pocket, fill your pipe, light it, and put the tobacco back in your pocket, and this additional time put all together for a day won't delay a single train nor block a single yard. The Erie Railroad authorizes you to use this time for your own protection, and none of the officials will criticise you for taking the time to do your work the safe way.

Digitized by Google

"The Fight Against Fire"

Conservation of Life and Property By Safe Construction, Fire Prevention Methods and Fire Protection

SAFETY ENGINEERING offers each month one First Prize of $10.00 *and one Second Prize of* $5.00 *for Articles, Suggestions, etc., relating to Safe Construction, Fire Prevention and Fire Extinguishment. In case of a tie, the full amount of the prize will be paid to each tied contestant.*

No. 110 CO-OPERATION IN FIRE-FIGHTING.—Has it ever occurred to the readers of SAFETY ENGINEERING how much more could be accomplished in "The Fight Against Fire" if the different towns and communities would co-operate with each other more often, follow the Golden Rule more generally and use some good common sense instead of stubbornness and jealousy?

Let me cite a few instances that I know of: A fire was discovered in a fine old country mansion. The fire was more than the local apparatus could handle, so they asked for aid from the next community, which refused to respond to the call for aid because of an ordinance or some other foolish regulation that forbade it to answer calls outside of its boundary line. The burning house was about two blocks beyond the line.

In another case, last winter, a town that had recently bought a modern chemical engine of the speedy automobile type, was called upon for aid from the next town and refused because the roads were heavy and covered with snow. If there had been broad-minded men at the helm, in either of these instances, they would have responded to the call in spite of an ordinance drawn by narrow-minded politicians; or in the other case would have taken a chance on getting a nice new auto all mussed up or stalled on the road. Instead of hearty and neighborly co-operation, in most cases we have mean, petty jealousies and political squabbles.

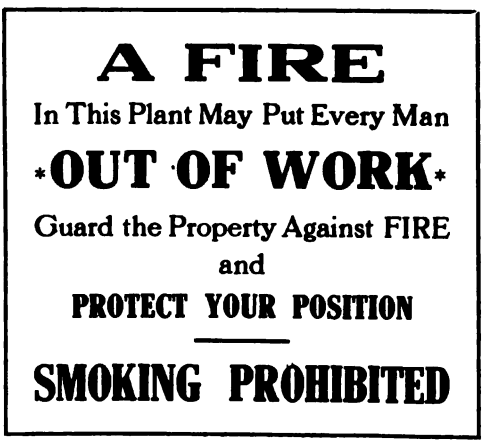
If two neighboring towns are buying fire apparatus and have, say, $2,000 each to spend, they find that they can get apparatus for $2,000, but could get the best for $4,000, do they get together and each give an equal amount and own the $4,000 apparatus co-operatively? Not much. Each would suspect the other of trying to get the best of the bargain.

The same is true of cities and municipalities along rivers and harbors. Each has its separate fire department, as good as it can afford. Some good sized cities along the waterfronts have no fire-boats. Perhaps it is too much of an expense for one city, but what is to prevent several of the cities from clubbing together to maintain a fireboat?

Some of my readers may not think this co-operation possible, but I know of four municipalities that have been running an ambulance service for some years on this principle. Co-operation is a success when applied to business. Why not apply it to fire apparatus?

❦ ❦ ❦

No. 111 SIGNS AND SIGNS.—There are "signs and signs," but the "Safety First" sign worth while is the one that will attract



Digitized by Google

attention and make a lasting impression. Such an impression is best brought about by thorough thinking.

There is a Southern lumber corporation which uses a "No Smoking" sign that is more effective than anything that has yet come under the observation of the writer.

Psychologically this sign is perfect. It brings home to the workman, most forcibly, exactly what a fire in the plant would mean to him and his family. How many workmen ever stopped to think, as they lighted their pipes, of the terrible after-effects of a fire in their plant? This sign is calculated to do that at least. It is printed in black and red. (See preceding page.)

One sign of this type, that will start one's brain to work, when placed in a conspicuous place will do more good than a dozen cards with simply "SMOKING PROHIBITED" on them tacked up promiscuously.

Prizes for June Articles

First Prize. No. 106. Thomas J. Lucas, Fireman, First Grade, Hook & Ladder Company No. 115, Long Island City, N. Y.

Second Prize. No. 107. V. L. Benedict, Manager, Los Angeles Fire Alarm Company, Los Angeles, Cal.

Other meritorious articles were contributed by P. L. Davis, Special Agent Hartford Fire Insurance Company, Vicksburg, Miss.; C. W. McKeehan, Secretary Fire Marshal, Oklahoma City, Okla.

Comments by Members of the Committee

Article No. 106 specifies the hardships the public has to contend with in fire and its causes. On the safe and sane side of things the fire prevention inspector not only protects their property but increases the percentage on their financial interests. Practically speaking fire is a law unto itself. We must learn how to destroy it. Being a destructive demon we must wield a bludgeon to exterminate this tyrant that destroys life and property.

❦ ❦ ❦

I vote for No. 107. It seems hardly possible to place too much emphasis upon the dilatoriness of school boards in securing the remodeling of schoolhouses. Day after day experience proves the seriousness of the hazards offered by various hitherto accepted types of construction, yet the old buildings are continued in service. And details of construction do not cover the whole story. Bad housekeeping is just as prevalent in our school systems as poor buildings. I have heard of a case where an old and badly worn wooden staircase furnished the only means of egress for small children on the second floor, and the cupboard under this staircase was used as a storage room for paints, oils and varnishes, the lighting being supplied by an unguarded gas jet.

❦ ❦ ❦

The subject discussed by No. 107 is one of particular interest and importance and one that requires constant repetition of warnings. The lessons of disasters are soon forgotten. School committees are largely political and very rarely contain even a single member versed in the principles of fire protection. Therefore, too much missionary work is impossible. No. 107 is well written, accurate and to the point, and consequently I give it my vote. In doing this I do not want to disparage No. 106 which is so good as to leave no basis of choice beyond the vital interest of subjects.

❦ ❦ ❦

I vote for No. 106 because it explains the nature of fire, the conditions that cause fire in general, and the measures possible for relief or cure and their special application to particular cases.

Digitized by Google

A Live Bulletin Board

National Safety Council.

ANY factory can have a brief spurt of "Safety First," and then let it die. How to keep safety uppermost in the minds of the workmen—really interesting, month in and month out—is the problem many employers are anxious to solve. A live bulletin board in each department is a practical solution of this problem.

The majority of companies which are doing efficient safety work have adopted the bulletin board idea, and find it a cheap and effective means by which they can keep continually before the men the subject of safety.

A bulletin board can be made as interesting and up-to-date as a newspaper. Constant change and variety is the secret; always something new; something striking; a lesson of actual experience. The material on a bulletin board should be completely changed at least once each week. The men will read the bulletins, if the "punch" is there. This is the experience of all companies.

Some one man should be made responsible for keeping up the bulletin boards—but the foreman, the safety committeemen, and all employes should be encouraged to help. Make it a shop newspaper—this will add to the interest.

Each department should have its own bulletin board, and it should be located at a point where the men pass on their way to work, or where they congregate.

The following suggestions will indicate the sort of exhibits which have been found most interesting and effective in driving home to the men the importance of safety:

Pictures are always the most interesting—pictures of men who have narrowly escaped injury, and pictures showing how accidents happened.

Stories of actual accidents, including name of injured, date of accident, how it happened, disability, time and wages lost; what might have prevented the accident.

Newspaper clippings giving accounts of accidents which have occurred in other plants.

Pictures showing dangerous practices —the wrong way and the right way of doing the same work.

Exhibit on infections, including pictures of infected hands, statistics showing large percentage of infections caused by neglecting slight injuries, and instructions on how to prevent infections.

Graphic chart in colors showing causes —accidents caused by carelessness should be emphasized.

One company exhibited a cold chisel with a mushroomed head which had caused the loss of an eye. A chisel with a properly ground head was placed beside it. Above was the photograph of the injured man, and below was the story of how the accident happened. This is the sort of exhibit which really reaches the men and leads them to take safety work seriously.

Another company arranged on a bulletin board 42 pairs of goggles, each with one lens broken. On a piece of paper pasted on the face of the unbroken lens was printed the name of the man who wore the goggles and the story of the accident which might have destroyed his eye had it not been for the goggles. A large sign across the board read as follows: "42 Eyes Saved—10 Months."

Posters giving suggestions on sanitation and personal hygiene—such as dangers of contracting tuberculosis, lead poisoning, value of fresh air, care of eyes, cleanliness, etc.

Attention called to safety rules which are being disregarded should be occasionally posted on the bulletin board with notice of enforcement.

Names of members of Workmen's Safety Committees, with an appeal for co-operation.

Important suggestions made by workmen.

Safety slogans stimulate interest—a new one should be posted each week.

Many companies post a schedule each month showing accident records of departments compared with previous month or year. A roll of honor is included.

Digitized by Google

MATERIALS, APPARATUS, PROCESSES

IN THIS DEPARTMENT APPEAR REVIEW-ARTICLES ON PRODUCTS WHICH CONSERVE LIFE AND PROPERTY. THIS INFORMATION IS SECURED LARGELY FROM MANUFACTURERS. WE ACCEPT NO PAYMENT FOR ITS PUBLICATION

PEELLE ELEVATOR DOORS

The Peelle Company was recently awarded the Gold Medal at the International Exposition of Safety, New York, for the Peelle freight elevator door. Having enjoyed a successful career for many years as manufacturers of the Peelle door, this concern has recently moved to Brooklyn, seeking larger quarters to take care of their increasing business. This concern was founded in 1886 by C. M. Peelle. The Peelle door was the first freight elevator door to secure the underwriters' label. This door can be furnished with any type of panels, such as metal clad, kalamein, or fancy paneled to match the surroundings. The new Peelle plant at Stewart Avenue and Harrison Place, Brooklyn, N. Y., furnishes ample facilities for the production of Peelle doors. The company extends an invitation to any one who cares, to visit their factory and see the Peelle door being manufactured. Quality and service are important features with the Peelle Company. "Safety First" is a live policy with this concern. The Peelle door operates entirely inside the elevator shaft on the counterbalancing principal. It is horizontally in the center. It is always closed when not in actual use, thus preventing accidents caused by people exposing themselves in the line of travel of the elevator car. The reinforced steel bar which forms the top of the lower panel is held firmly at the floor level and obviates entirely the danger of truck wheels slipping down into the gap usually found between the elevator car and the building floor. In case of fire, a special device will automatically close any door which may be open.

Further particulars can be obtained by writing to the above mentioned concern.

EXPANSION OF PYRENE COMPANY

The Pyrene Manufacturing Company which has devoted itself exclusively, for some years, to the manufacturing and selling of the Pyrene extinguisher, and which has had a very successful career, having built up a national selling organization, is now prepared to supply through its 44 branch offices, at home and abroad, not only an extensive line of fire fighting and fire prevention apparatus and safety devices, but also under the leadership of Chief Guerin, expert advice for surveying factories, schools, etc., in regard to fire prevention and the protection of life and property against destruction. A competent inspector is maintained in each of the branch offices of the Pyrene Manufacturing Company. Regarding the apparatus and devices which the Pyrene Manufacturing Company supplies, the company states that only the most reliable appliances for their specific purposes are furnished, quality being a foremost feature. A complete stock is maintained at each branch office and every product sold is guaranteed by the label "Passed by Chief Guerin." The Pyrene Manufacturing Company has issued a 128-page book, describing and illustrating the complete line of Pyrene fire and safety appliances. A copy of this fire appliance catalogue will gladly be sent on request to the Pyrene Manufacturing Company, New York City, or at any branch office in leading cities.

SAFETY GOGGLES AT THE FRONT

From reports, it appears that sand storms and a temperature of 112 in the shade, occasion great discomfort to American soldiers on the Mexican border. In a letter received from a corporal in a Coast Artillery regiment, quartered at Laredo, Texas, the sand nuisance is mentioned as follows:

"The sand is the worst part of it all. It gets into everything. I eat about a tablespoonful of it every day."

Dr. Frederick Willson of T. A. Willson & Company, Reading, Pa., after studying the need of eye protection for Mexican service, presented each man in the National Guard from the City of Reading with an Albex Eye Protector. This goggle has ventilated leather side guards, and adjustable bridge and cable temples. The goggles furnished the militia are provided with amber in various shades. A compact steel case completes the outfit. The men from the City of Reading now on the border find the goggles a great comfort and protection against the sand storm danger.

SANITARY DRINKING FOUNTAINS

A public drinking cup is no longer tolerated. It has been conclusively proved to be a dangerous menace to health in spreading disease.

Digitized by Google

Sanitary drinking fountains are now recognized as an absolute necessity. In manufacturing and mercantile establishments, it is now the practice to instal sanitary bubbling drinking fountains. The H. Mueller Mfg. Co., Decatur, Ill., manufactures several different sanitary drinking fountains for manufacturing and industrial plants, schools, hotels, public buildings, etc. The Mueller Pedestal Sanitary Bubbling Drinking Fountain is operated by a foot pedestal at the base of the fountain. The bubbling head is attached to the supply in such a manner as to insure against theft. The foot operation is a very important feature, and is approved by boards of health and sanitarians, because it eliminates the danger of infection from unclean hands. This concern also manufactures sanitary drinking fountains for walls, sinks, etc.

Further particulars of the Sanitary Drinking Fountains can be obtained from the above mentioned manufacturer.

PATCHING CEMENT FLOORS

One of the principal objections often raised against the use of concrete finished floors is the difficulty and cost of successfully repairing places that become worn or damaged. For best results it is usually considered necessary to cut down the worn place at least one and a half inches into the unbroken concrete, undercut the edges, clean out the dust and loose particles thoroughly, wash with a thin cement grout, fill in with a paste grout and finally float to a level surface a mortar of cement and crushed stone or gravel. The patch must then be kept moist for at least a week or ten days, keeping all traffic off in the meantime.

Mr. W. P. Anderson, president of the Ferro Concrete Construction Company, states that his company often uses a method of patching concrete floors which is much cheaper and requires far less time than the method commonly used. Mr. Anderson's method requires the use of a mastic material made from a mixture of asbestos fiber and rubber gum. This mixture is applied with a trowel after thoroughly cleaning the damaged surface. Very little cutting of the old concrete is necessary, other than to break off loose particles. The gum can be worked to a feather edge so that it will readily join with the undamaged concrete surface and eliminate the under-cutting required with the old style of patch.

A patch of this sort can be opened to foot traffic within a few hours and to heavy traffic within a day or so. It is thus possible to repair a much-used portion of a mill or factory floor almost over-night. The cost varies with the size of the patch, but will amount to from 16 to 18 cents per square foot.

PRACTICAL SAFETY METHODS AND DEVICES

George A. Cowee, E.M., S.B., manager, Bureau of Safety, Utica Mutual Compensation Insurance Corporation, has recently issued a new book "Practical Safety Methods and Devices," consisting of 440 pages, 127 illustrations. The 27 chapters are devoted to industrial safety and accident prevention. Tried and proven methods and devices are described and illustrated reflecting the experience, methods and ideas of practical men in varied fields of industrial activity. This book is the result of careful observations made in a great number of mills and manufacturing establishments, in building and construction work, railroad operation, handling explosives, and mining.

Orders for "Practical Safety Methods and Devices" may be sent to SAFETY ENGINEERING, 80 Maiden Lane, New York.

SAFE-CABINET INCREASES ITS NEW YORK QUARTERS

The New York branch of the Safe-Cabinet Company, through its manager, Mr. F. B. Cutter, has closed for a long-time lease the second floor of No. 304 Madison Ave. It is the intention of the Safe-Cabinet Company to house in the new quarters its export department, its leasing department and also the domestic sales, and in addition to the various offices of these departments, it will also devote a large area for floor display, which is necessary to show the many styles of Safe-Cabinets and the various adjustable units.

This company, under the direction of Mr. Cutter, has enjoyed a most remarkable growth, and by reason of this it was found necessary to more than triple the size of the present quarters in order to take care of the customers in the Metropolitan District.

The Safe-Cabinet Company has been most successful, and the high awards given it at the recent expositions at San Francisco and San Diego, and also the endorsement given its product by the National Board of Fire Underwriters, marks this product as being worthy of the deep confidence and security reposed in same by the buying public.

THE NEW TYPE "B" PULMOTOR

The manufacturers of the New Type "B" Pulmotor claim this is the first and only hand-operated resuscitation device insuring safe and efficient pressures. It is constructed upon the resuscitation principle universally recognized by great physiologists—measured pressures.

The distinction is a very serious and important one. All efforts to produce hand-operated resuscitation devices up to now have resulted only in machines producing measured volumes of air, which necessarily depend upon the amount of pumping done. As a result, the real control has been centered in the man at the pump, whose only idea has usually been to pump as much air as possible. Consequently, the air volumes could not possibly be uniform. The amount of pumping and pump conditions (such as possible leaky valves) would cause continual variation and

Digitized by Google

would apply pressures entirely unsuited to the type of patient and the requirements of his case.

Type "B" Pulmotor control is all centered in a new invention—the pulmotor pressure control valve. This valve is operated entirely independent of the pump. It is a combination valve, in that it not only applies but controls air pressures, producing inhalation or exhalation of the patient's lungs. This control is so positive that the operator may exert the exact pressures desired at every stage.

This pressure control valve is worked in the hands of the operator who is at the patient's head—not at the pump. By its construction, the pumped air cannot "back up" in to the pump. A pressure once obtained is maintained until the valve lever releases it. Consequently, the operator need only move the lever back and forth to obtain uniform exhalation and inhalation, timing these with his own breathing. The man at the pump need not pump continuously. He need only produce the amount of pressure desired by the operator and maintain this by an occasional stroke, as necessary.

The operator's entire attention is centered upon his patient—as it should be.

There is another important feature of this new Pulmotor pressure control valve—the indicator gauge on each side of the valve, which shows the operator exactly what pressures are being exerted on the lungs at all times. This feature meets the requirements of different lung pressures for different ages. The pressures for an infant should be far less than those for an adult. An alcoholic case may require entirely different pressures from a drowning case.

Another exclusive feature of Type "B" Pulmotor introduced for the first time in a hand-operated machine, is the definite indication of the resumption of normal breathing. This is shown by the indicator gauges. As soon as the patient attempts to resume normal breathing, these gauges flutter.

Type "B" Pulmotor has been produced especially for use in cases where apparatus must be taken to the patient. The hospitals of America, the great public service corporations, chemical, mining and manufacturing concerns are today users of the world famous original pulmotor.

Type "B" Pulmotor meets the peculiar need for a machine that is much lighter and easier to take to the scene of accident and which at the same time has a maximum flexibility in its operation.

Further particulars of the Type "B" Pulmotor can be obtained from the Draeger Oxygen Apparatus Company, 422 First Ave., Pittsburgh, Pa.

UNDERWRITERS' LABORATORIES

Recent Approvals and Reapprovals

"Aero" Automatic Fire Alarm. Aero Fire Alarm Co., Inc., New York. This system utilizes principle of expansion, under heat, of air contained in a small tube, which is installed along ceilings or piping. Tube leads to contact-closing and test devices of special type. Expansion of air in tubes actuates a diaphragm closing an electric circuit whereby signal is transmitted.

"Erwin" Automatic Fire Extinguisher. Treadwell Co. of Illinois, M. H., Chicago, Ill. Stationary automatic foam fire extinguisher for use in connection with containers, up to 55,000 barrels capacity, holding crude oil, benzine, naphtha, gasolene and benzol.

Folding Steel Ladder—"Kingsteel." Vaughan & Bushnell Mfg. Co., Chicago, Ill. Folding steel ladder in sections. When extended automatically interlocks to form rigid, straight ladder.

Hardware — Sliding Pattern. Richards-Wilcox Mfg. Co., Aurora, Ill. Hardware for sliding, tin-clad, fire doors and shutters.

Hardware—Swinging Pattern. Allith-Prouty Co., Danville, Ill. Hardware for swinging, tin-clad, fire doors and shutters mounted singly and in pairs.

Inside Power-Operated Discharge Device. Martini & Huneke Co. of America, Woolworth Bldg., New York. Discharge and control valves for pressure system.

Jointer Head. Crescent Machine Co., Leetonia, Ohio. Cylindrical steel cutter-head for jointers or hand-fed planers.

Motor-Vehicle Locking Device. Esco Mfg. Co., Detroit, Mich. Gasolene shut-off valve installed in fuel supply line between carburetor and all sources of fuel supply and operated by protected lock-controlled linkage interconnected with protected switches for controlling electric circuits.

Open Sprinklers. International Issue "A" ¼, 5/16 and ⅜-in. International Sprinkler Co., New York. These open sprinklers are of the shovel type and are intended for use in connection with the protection of windows, frame buildings, mansard roofs, etc., from exposure fires.

Open Sprinklers. Rockwood Issue "A" ¼, 5/16 and ⅜-inch. Rockwood Sprinkler Co., Worcester, Mass. These open sprinklers are of the shovel type and are intended for use in connection with the protection of windows, frame buildings, mansard roofs, etc., from exposure fires.

Rolling Steel Fire Wall Doors. Kinnear Mfg. Co., Columbus, Ohio. Automatic, double, rolling steel fire doors.

Rolling Steel Fire Wall Doors. Variety Mfg. Co., Chicago, Ill. Automatic, double, rolling steel fire doors.

Rolling Steel Fire Wall Doors. Wilson Corporation, Norfolk, Va. Automatic, double, rolling steel fire doors.

Safety Can. John C. Eames, New York. Sheet-metal receptacle provided with automatically closing cover, or valve, for storing and handling open stocks of hazardous liquids.

Sliding or Swinging, Sheet Metal, Fire Wall Door. Saino Fire Door Co., Memphis, Tenn. Door made of two sheets of corrugated galvanized sheet steel stiffened by a surrounding frame of reinforced members made of galvanized sheet steel.

Sliding or Swinging, Tin-Clad, Fire Wall Door. Fire Prevention Contracting Co., New York. Three-ply, tin-clad door designed for protection of openings in fire walls.

Sliding or Swinging, Tin-Clad, Fire Wall Door. Syracuse Fire Door Co., Syracuse, N. Y. Three-ply, tin-clad door designed for protection of openings in fire walls.

Swinging, Sheet Metal Shutter. Merchant & Evans Co., Philadelphia, Pa. Shutter made of two faces of corrugated galvanized, sheet steel, stiffened by a sheet metal frame reinforced by steel bars.

Test Chart Cabinet. Hardy & Co., Chicago, Ill. An electrically-illuminated, translucent chart having lamps in several compartments individually controlled from a remote point by a selector switch connected to cabinet by special multiple cable.

Digitized by Google

SAFETY ENGINEERING

Vol. 32 AUGUST, 1916 No. 2

Current Comment and News

C. W. PRICE, assistant to the Wisconsin industrial commission, known to managers, superintendents and foremen of every large industrial plant in Wisconsin, is leaving the State's service to become field secretary of the National Safety Council. For five years Mr. Price has been the chief instrument of the industrial commission in carrying out its program of accident prevention and factory sanitation, including ventilation and illumination. Through his work thousands of dangerous machines have been guarded and thousands of accident-causes have been removed for all time. Farmers have been shown how to guard corn shredders and feed cutters, to eliminate ghastly accidents which were common not long ago. In showing employers how to guard against accidents, Mr. Price has extended his safety campaign into ships, through the logging regions and into stone quarries and lead mines.

C. W. PRICE
Field Secretary, National Safety Council

Mr. Price went to Wisconsin from the Harvester works in Chicago to work out the safety plans which had already been adopted by the newly created industrial commission. Through representative committees of employers and employes, of which he acted as executive secretary, practical standards were established on which orders were issued covering the entire field of safety and sanitation. He has spent much time in educational work, visiting scores of industrial centers with the commission's safety exhibit. In two years he delivered 400 talks on safety. In 13 large industrial centers, including Milwaukee, he helped organize safety round tables which have proven a most valuable means of stimulating interest and helping the manufacturers to solve their problems. Throughout his work he persistently emphasized the point that making shops safe and healthy was not good ethics, but also good business.

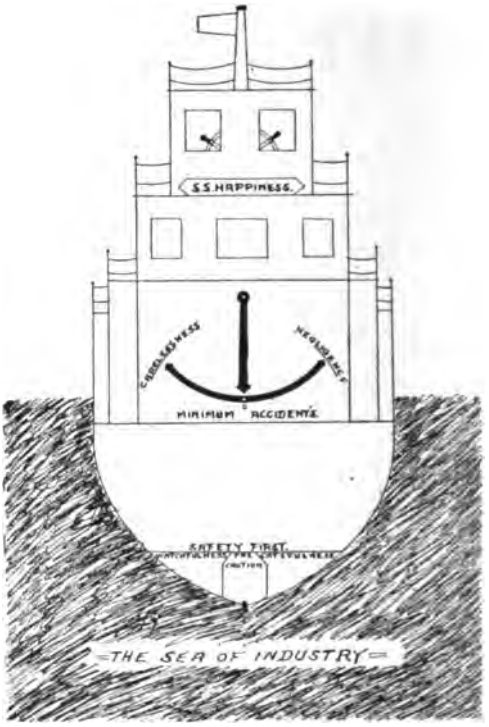
It is his intention to carry the Wisconsin idea into every State in the Union. The National Safety Council,

Digitized by Google

now about four years old, has about 3,000 members, with 100 in Wisconsin. Mr. Price will spend several weeks in each of the large industrial centers to organize local factory councils and round tables to carry on safety work. He will also assist State labor departments to adopt the Wisconsin plan, which is recommended as the highest standard by the National Safety Council.

"I came to Wisconsin to carry out the plan already formulated by the industrial commission," said Mr. Price, to the *Wisconsin State Journal* in speaking of his work. "Much has been accomplished in the State during these last five years. We owe our success chiefly to the splendid co-operation which employers and employes have given the commission. We have worked with committees of experts whose time could not be purchased by money; men who gave their time and talents free to the commonwealth. Among these men are rising business men, near-millionaires, artisans, anti-union men, members of union organizations. Every class was represented. These men gave their efforts for the good of humanity. That is what I call patriotism. There was nothing spectacular about it; it was just downright hard, grilling work without waving of flags or beat of drums. And yet, if saving of life and limb of workingmen and giving them comfortable and healthy work places is not real preparedness, I just wonder what the word 'preparedness' means. I have been working with committees for twenty-five years but I never have enjoyed such co-operation as I have met in Wisconsin."

ACCORDING to the reports of the coroner of Cook County, Illinois (says the Indianapolis *News*), there is more need for "Safety First" methods in the home than in street or factory. In 11 years of the Chicago coroner's incumbency the total number of deaths by accident investigated by his office was 29,864. Of these 15,241 were "accidents at home" and 14,623 "outside the home." Most of the accidents at home are traceable to carelessness. Burns and scalds caused many deaths. Asphyxiation, poisoning, suffocation, falls, exposure and neglect, careless use of matches, firearms, gas and oil stoves, gasoline, liquid stove polish, defective stove pipes and flues, soot, etc., cost thousands of lives. In Cook county in 1915, 105 children under five years of age were killed by scalds and burns. The *Journal of the Association of Foreign Language Newspapers* prints an article by the Secretary of the Chicago Public Safety Commission which shows that carelessness, causing loss of life in the home, is not confined to Chicago. In New York City, it is said, 179 persons were killed by fires resulting from matches, candles, lamps, bonfires and explosions. Sixty-five of these were children under 14 years. It is commonly said that we burn more matches in the United States than all other countries combined. Matches when carelessly used are a prolific source of fires. The weekly bulletin published by



The Manitowoc Safeguard.

Safety First Navigation

Digitized by Google

SAFETY ENGINEERING reports that in the three months from December 1, 1915, to February 29, 1916, property loss by fire totaled $56,303,600. In these fires 92 persons were killed and 155 injured. Placards in public places and safety devices in factories will not succeed in greatly reducing the enormous toll of deaths by accident in the United States unless the lesson is taken in the home. Railroads, manufacturers, business firms and social organizations mitigate the evil, but their efforts will be largely unavailing if the carefulness inculcated in the shop or business ends there. A mere summary of the source of accidents indicates that the underlying cause is carelessness. The deaths of children by scalds or fire, especially, seem to fall into this category.

Photo by Social Press Assn., N. Y.

Storage Warehouse, 150th Street and Amsterdam Avenue, New York City. The owner of this warehouse ignored orders issued by the fire commissioner of New York City several months ago. The fire commissioner has begun proceedings against him, under the law, to recover damages.

THE burning of the Uneeda Storage and Van Company's Warehouse in New York City, July 27, caused a panic among families living in apartment houses in the Washington Heights section. The property loss was estimated at nearly $1,000,000. When a tower fell, 4 firemen were buried under the debris and seriously hurt. Four other firemen were injured by falling glass. At an investigation conducted by Fire Commissioner Adamson, the chief of the New York Fire Department said that if orders issued to the owner of the warehouse in March, 1916, had been complied with the fire would have been a small one and the damage trifling. The fire wall, ordered constructed by the Fire Commissioner would have prevented the fire from spreading throughout the building and would have given the firemen a vantage point from which to attack the fire.

UNDER the heading, "Joking with Death," the Pittsburgh *Leader* says: "The relation of speed in machinery to industrial accidents is brought out with brutal clearness by the statement of Commissioner Jackson, of the Department of Labor and Industry. High speed in work is not the only factor, but, in the judgment of Commissioner Jackson, is the determining one.

Digitized by Google

The report of the bureau of statistics of the department covering the casualties of the first 6 months of the current year will give many a severe shock, for the figures total almost as many accidents as reported for the entire 12 months of 1915. To those who have never chained their faith to the surface picture there will be no surprise, for to anyone familiar with industrial operations it is well known that only a fraction of all the accidents were ever reported. Suppression is the rule. Commissioner Jackson explains the heavy increase in the number of casualties reported to the bureau of statistics under 3 heads: Complete returns through the operation of the workmen's compensation law; the increased number of men employed in industrial plants; the maximum of speed in the machinery. Of the 3, speed is credited with the largest responsibility. The extraordinary activity produced by the demand for war materials drew into the ranks of the workers every available man. With so much more human material to draw upon it should excite no surprise that the high speed added to its victims. The main points which the public should consider in the illumination of these figures are the accusation made against the results of high speed in machine production, and that it took the strict provisions of the compensation law to secure a complete statement. If the workmen's compensation law did nothing but furnish the evidence that only half of the industrial accidents were made known it gives the State an excellent service. Those who will be surprised, perhaps a little stunned, by this report of the casualties of the year's first half, are those who, theoretically enthusiastic over the campaign with "Safety First" for its slogan, complacently believed that industrial accidents had been thereby reduced to the minimum. But after two years of intense agitation accidents in 'Safety First' plants have doubled if we do not accept Commissioner Jackson's explanation that the greater number is only because of the fuller reports due to the new law. 'Safety First' has become an empty phrase, is nothing but a common ethical anesthetic. The big facts which stick out all over this report, giving due weight to Commissioner Jackson's interpretation, are that when the dollar in the shape of profit is at stake employers give no thought to the lives of industrial workers. The second is that when the demand for extra exertion is upon them, with the means of life for their families at stake—their jobs in short—men will run every risk, even when they know that death is to blow the stopping whistle. Profits, excessive profits, as in this case, on one side, and the dependency of wage workers upon those crazed for profit on the other, seeing nothing else, ignoring the claims of human life, for the existence of themselves and families, explains the ghastly details in 1,136 fatal accidents in six months. 'Safety First' is turned into a practical joke played by death upon wage workers."

C. W. WOODMAN, State labor commissioner of Texas, believes that all employers are anxious to reduce the chances for accidents to the minimum, and at the same time to safeguard their machinery. The commissioner has issued suggestions and recommendations to employers which, if adopted, will aid materially in preventing accidents. The recommendations: "That all safety appliances be painted red, and that all receptacles for gasoline be painted the same color. In our inspections we frequently find a safety device lying on the floor; taken off usually to make repairs, and left off through carelessness. Painted red, it will be readily seen and will be a constant warning. Besides, painted red, while in use it will be a constant warning to the user of the machine that care should be taken. The importance of having gasoline receptacles painted red is impressed upon the labor department by the numerous accidents occurring through mistaking a can containing gasoline for something else. The cost attached to carrying out these recommendations of the State labor department will be small. Carried out, many lives and limbs will be saved."

Digitized by Google

The Explosion at Black Tom Island

Photo by Social Press Assn., N. Y.

Where the Water Is Shown in the Foreground Cars Loaded with Explosives Were Standing Before the Explosion. The Big Hole Tells Its Own Story

Photo by Social Press Assn., N. Y.

Digitized by Google

Lehigh Valley Railroad Company's Pier 5. Shaken Down by the Explosion

Photo by Social Press Assn., N. Y.

Lehigh Valley Railroad Company's Pier 4 as It Looked 36 Hours After the Disaster

Photo by Social Press Assn., N. Y.

Looking from Pier 5 Toward the Burned Storage Warehouses

Digitized by Google

Copyright, International Film Service, Inc.

One of the Wrecked Barges. Photo Taken the Next Day

Copyright, International Film Service, Inc.

Wrecked Altar of St. Peter's Church, Jersey City. Property Was Damaged, of Which This Is an Example, Within a Radius of 8 to 10 Miles from Black Tom Island. St. Peter's Church, However, Was Not So Far Away.

Digitized by Google

Official Slowness In The Black Tom Island Investigation

BEYOND the knowledge, not soon to be forgotten, that the terrific explosion on Black Tom Island, in New York bay, early in the morning of July 30 destroyed about $20,000,000 worth of property, 7 lives and injured (slightly, in nearly all cases) several scores of persons, few other facts are known, at the present writing, concerning the cause of the disaster or the responsibility therefor.

Several investigations started very promptly but they did not progress. The authorities of Jersey City and of the State of New Jersey withdrew their own "probes" and promised to give their cooperation to the authorities of Hudson County, New Jersey, who are supposed to be conducting a painstaking inquest under the charge of the county prosecutor, Judge Hudspeth. Another investigation (possibly the only one that will have real value when the report is ready) is the investigation by the Bureau of Explosives, Colonel Dunn's bureau.

The National Board of Fire Underwriters has petitioned the Interstate Commerce Commission to conduct a Federal inquiry, giving these reasons among others:

"Your petitioner further represents that great as was the damage done to property by this casualty, the amount of property now subject to similar hazards through its proximity to the terminal lines and property of interstate common carriers in the various ports and in the cities of the United States is infinitely greater than the amount of property destroyed on this occasion. It is presumed that the transportation of similar commodities in immense quantities is at this time continuing and will continue for a considerable period.

"For these reasons the interests of the public require that all of the facts concerning the origin and circumstances surrounding or contributing to the cause of the casualty should be definitely determined to the end that such preventive measures may be taken as will enable your commission and other public bodies to provide suitable regulations for handling and storage of such articles as will minimize the possibility or prevent the recurrence of a similar disaster. Without the aid of a public investigation, it is not possible to ascertain the facts surrounding the origin, circumstances and cause of the disaster, which is imperatively necessary to protect the interests of property holders in the vicinity of such activities.

"A public investigation seems desirable to ascertain; First, the kind and amount of explosive substances which were on Black Tom Island at that time, how handled and stored, and for what period of time detained; second, what laws—Federal, State and municipal—covered the transportation, handling and storage of such high explosives, and in what manner are State and municipal governments restricted in their regulations on account of a priority of the regulations of the Interstate Commerce Commission; third, the contributing and direct causes of the explosions and fire and attending circumstances; fourth, the effect on fire department operations of the known proximity of large quantities of high explosives; fifth, the method of handling and storage and the cause of the explosion and fire, which would be of inestimable value to those concerned with prevention of such casualties, especially to Federal, State or municipal officials charged with the preparation and enforcement of laws dealing with this subject.

"Your petitioner further represents that it believes much of the information necessary is in the possession of interested parties directly concerned, which it would be impossible to obtain unless handled through a body with sufficient power to compel the attendance of witnesses, and it further believes that many of the witnesses are located in the different States of New York and New Jersey, or are harbor and sea-faring peo-

Digitized by Google

ple, and for this reason it is eminently proper and necessary that there should be a Federal investigation which can properly be carried on by the commission, since it involves commerce between the different States of the United States and between the United States and foreign countries, and concerns the transportation of explosives and munitions of war by railroad common carriers. It is desirable to ascertain the primary and contributing causes of such casualties, including, among others, the following leading causes:

"1. By fire on a barge moored at the pier terminal of a common carrier.

"2. By intentional or sinister act.

"3. By collision of cars of explosives in connection with operations of railroads.

"4. As the result of a fire which is reported to have been in progress for a period exceeding one hour before the first serious explosion.

"5. By neglect to make proper effort to extinguish the fire either through private fire departments or by calling upon public fire departments for that purpose.

"6. By failure of any duty on the part of persons or corporations in properly handling, storing, protecting and transporting such explosives or munitions so being transported in interstate and foreign commerce; and this can only be determined by a public investigation by the commission, which has full power to compel the attendance of witnesses and the giving of testimony. . . .

"Your petitioner, the National Board of Fire Underwriters, therefore prays that this honorable Commission will proceed, through the medium of the Commission or one of its number, to hold in the vicinity of Black Tom Island a prompt public and open investigation into the causes and circumstances of such Black Tom Island disaster, and thereupon to make such recommendations and regulations as will tend to minimize the danger or prevent a repetition of such accidents."

JERSEY CITY FIRE DEPARTMENT'S REPORT

"At 12:40 a. m. Sunday, July 30, a still alarm came in from the American District Telegraph Company that there was a fire over at the National Docks and Storage Company's plant at Black Tom Island. Several fire engines were sent to the scene, and Battalion Chief Gately, who was in charge, called up and told Chief Boyle that there was a big blaze, but that he was not able to get his engines within striking distance. The chief went over and succeeded in getting the engines close to the scene of the fire.

"The best information is that the fire started among some freight cars at the end of one of the piers, and that the sparks spread to a lighter named *Johnson No.* 24, tied up to one of the Lehigh Valley piers adjoining the warehouses of the National Docks and Storage Warehouse Company.

"The first explosion was on the *Johnson*, which, it is understood, contained high-powered explosives. Later on there was a second explosion. The police investigation disclosed the fact that there were several cars adjoining the burning freight cars loaded with munitions, and that the second explosion was on these cars.

"The investigation shows that on Saturday, July 29, twelve cars of the Central Railroad, loaded with 3,125 cases of ammunition and explosive projectiles, were transferred to the *Johnson No.* 24. That the *Johnson No.* 24 was loaded up at 2:30 p. m., and, according to the Federal regulations, should have gone out into the bay at New York or proceeded to its destination at Gravesend Bay, where the explosives were to be transferred to a steamer. Instead of doing that, it went to the Lehigh Valley pier and tied up there, against the express orders of the Lehigh Valley officials.

"Martin T. Henley, night general yardmaster of the Lehigh Valley; J. M. Kane, watchman at the National Docks & Storage Company's plant, and A. M. Dickman, agent of the National Docks & Storage Company, protested against this barge being tied up to the pier.

"When the fire started among the freight cars, Henley, the night general yardmaster, and Chief of the Lehigh Valley Police Cornelius Leyden

Digitized by Google

went down to investigate the cause. They were standing close to each other when the first explosion took place. Henley had his coat buttoned up; his coat was torn open and his watch and chain in his vest pocket were blown out into the river. The last he saw of Leyden was going in the direction of the river on the pier; the supposition is that he was blown into the bay and drowned."

OFFICIAL STATEMENT BY THE LEHIGH VALLEY RAILROAD

"Thirteen brick storage warehouses out of the 24 owned and operated by the National Storage Company and 6 piers owned by the storage company and leased to the Lehigh Valley Railroad were destroyed. Several others of the brick warehouses were badly damaged and some minor damage was done to the Lehigh Valley's grain elevator.

"In addition, 85 loaded cars were destroyed. According to evidence obtained by officials of the railroad company, the fire started at 1:05 o'clock Sunday morning in a barge belonging to an independent towing company, which had been moored alongside the railroad company's docks expressly against orders.

"M. T. Henley, night general yardmaster for the New York division of the Lehigh Valley railroad, was on the pier when the fire started. He said the explosion which occurred at 2:08 o'clock was on the barge where the fire started. Mr. Henley's first thought was to remove the loaded cars on the pier from the danger zone. He says that when he reached the end of the pier the barge was burning fiercely all over. The fire was beginning to communicate itself to some of the cars nearest by. Two long cuts of cars were successfully moved from the danger zone before the rapidly spreading fire engulfed the balance.

"As yet it has not been definitely determined just what the money loss will be. Some 40,000 tons of raw sugar, valued at approximately $3,400,000, are known to be lost, but it is believed the contents of the other warehouses destroyed will greatly increase this amount.

"There were no explosives stored in the warehouses, and only in two of the cars destroyed. These were loaded with shrapnel, which would not have been a source of danger except for the outside fire. The other cars were loaded chiefly with salt and borax.

"The scene of the explosion and fire is in no way adjacent to the main passenger and freight terminals of the Lehigh Valley Railroad at either New York or Jersey City, and the mishap will not interfere in any way with the operation of business."

ACTION BY THE COMMISSIONER OF PUBLIC SAFETY, JERSEY CITY

A statement by Frank Hague, commissioner:

"Complaints alleging manslaughter are to be made against Albert M. Dickman, agent at Black Tom of the Lehigh Valley Railroad Company; Theodore B. Johnson of the Johnson Lighterage & Towing Company, and Alexander Davidson, superintendent of the National Docks & Storage Company.

"These complaints will be made by James Connolly, Inspector of Combustibles of Jersey City. The warrants will be issued by Judge Mark A. Sullivan of the Hudson County Court of Common Pleas. Lieutenants Collins, Green and Noble will execute the warrants.

"Another man whom the police consider responsible is Alexander Davidson, Superintendent of the National Docks & Storage Company, whose home is at 233 Stegman street, Jersey City. The information is that he is the one who gave permission to the captain of the *Johnson* to tie up at the pier.

"Theodore B. Johnson lives at 156 Seventy-sixth street, Brooklyn. He is the head of the Johnson Lighterage & Towing Company, and the one thought to be responsible for the explosions, inasmuch as the captain of the lighter would not have tied up there unless he knew that it would meet with the approval of his employer."

Digitized by Google

Fire Hazards of Ammunition Manufacture

By W. B. Milne

Inspector, Underwriters' Bureau of New England.

"The general impression left on the writer, after numerous visits to ammunition plants, is that the fire hazards other than those of the powder blending and dry houses, and the loading of fuses, are neither unusual nor severe, while the loading of fuses when properly arranged does not constitute a serious menace."

THE European War, has created a new epoch in the history of American manufacturing industry and particularly in that division of industry known as the metal-working trade.

Since nearly every enterprise of the present day is dependent upon, or a customer of the metal-working trade, this industry is one very sensitive to general trade conditions. The outbreak of the war came at a time of industrial depression in this country, a time in which, by reason of general economy, the industries of the country were understocked and underequipped. While the outbreak of the war was followed by a period of hesitation which accentuated this condition, it was not long before the stimulus of "war-order" buying was felt, and the demand on the manufacturing industry increased by leaps and bounds. This demand was doubly reflected upon the metal-working trade by virtue of the direct demand for arms and ammunition, as well as by the demand from other industries for their necessary tools and machinery.

While some have thought that the great volume of increase in manufactured products in the past year has been due to a domestic demand merely awakened by a few scattered "war orders" obtained by large concerns, it is interesting to note how widespread the manufacture of war material has become among even the smaller established metal-working plants of New England, and it is difficult to realize what a variety of industries has been called upon to contribute. While very few manufacturing concerns have neglected their regular customers to manufacture war material, the latter business has been taken on as a side line by a vast number of plants in the hope of large profits, and the volume of business and hours of labor have been increased in many cases as far as the resources of the concerns have permitted, or as far as the ability to find the necessary labor, material, equipment and floor space have allowed. This extraordinary state of affairs has presented numerous problems for the consideration of underwriters of fire risks of industrial plants, and while the volume of insurance written on such plants has increased in a large and welcome proportion, certain elements in the risk have furnished cause for uneasiness. Among these the following may be noted:—

1. Prolonged hours of labor, night work, etc., have increased the period of action of the active special or manufacturing hazards.

2. A tendency toward uncleanliness has been created or enhanced by long hours of labor, the difficulty of obtaining satisfactory help, the increased congestion of equipment and material, and above all by the failure of superintendents through pressure of other business to give proper and routine attention to matters of housekeeping.

3. The introduction into established risks of new manufacturing or special hazards and processes. In some cases there has been failure to protect these in a satisfactory and permanent manner on the assumption that they were of a temporary character. In other cases there has been failure to realize the true nature of the hazard involved and an ignorance of established methods of protection.

Digitized by Google

4. The introduction of the hazards of construction in the building of extensions to existing structures. This feature assumes a prominent place in a consideration of a sprinklered risk, where the protection of the whole plant may be virtually set at naught by reason of failure to equip new portions promptly. The time required to equip new portions has been greatly increased by reason of the pressure put upon sprinkler companies and the general delay in obtaining materials.

5. Strikes and other evidences of unsettled labor conditions have had a bearing upon the fire risk.

6. Failure to produce, under war orders, goods acceptable to inspectors of the foreign governments has resulted in accumulations of rejected products which represent heavy losses to the manufacturers. This condition suggests the question of moral hazard.

7. Incendiarism springing from a desire to cripple plants producing goods is a subject given much attention in newspapers. While there have been incendiary fires in "war order" plants in New England, it would seem that they have resulted from the individual efforts of misguided men. There is certainly little evidence to show that any well-studied, intelligent or organized effort has been made to cripple factories by violence, in this section of the country, at least, but there are indications that financial means have been tried to limit or embarrass the efforts of certain munitions plants.

8. Another question of moral hazard has been raised by the visualization of conditions which may exist, when the war demand ceases, in those plants equipped particularly for "war business." This point raises a most interesting economic problem. There are a number of concerns which have built and partially equipped large plants for the production of munitions, but which have not yet produced appreciable quantities of acceptable goods. If the war should cease within a year these concerns might find themselves in critical conditions. Established plants manufacturing munitions as a side line may feel a period of depression during the readjustment which must follow the war, but in most cases this should not affect them seriously. The established plants, devoted prior to the war to the manufacture of rifles and ammunition, which have expanded enormously to meet war demands are powerful financially, and it is felt that the United States government will not permit their potential value to the nation to dissipate through idleness.

The value, in times of peace, of equipment installed for the manufacture of munitions varies in each individual case. In a general way it may be said that machinery, such as lathes, presses, etc., is of permanent value, while large quantities of dies, tools, patterns and gages will be of slight value when the war demand ceases. The cost of the latter may be considered as an expense of manufacture rather than as a capital charge against a business. In certain instances, however, the value lost in investing in such dies, patterns and gages will be very large and these cases will be found in those newly-established munition plants which were late in getting into the field and the net volume of whose total product is small. Where relatively small war orders have been taken by established factories as a side line, the orders were taken in early stages of the war demand and it is probable that the new equipment purchased has made adequate earnings. Some such concerns suffered heavy losses at first owing to having their product in large proportion rejected. Such equipment, however, was largely in the way of increasing that already possessed and will be of service to the ordinary output in times of peace, which simply means that they will be better equipped to manufacture the goods which new markets and reconstruction will demand. It is more difficult to forecast the conditions which will exist following the war in those large, well-known, and well-established plants which have made a specialty of munitions manufacture. It is probable that such plants have protected their capital investments

Digitized by Google

through guarantees in their contracts as to the continuance of the demand. It is understood that such concerns, as well as some others, have agreements with foreign governments whereby they may sell to the latter their special equipments at any time. On the whole, it seems to the writer that the more recently established plants equipped at large expense for a special product are the ones most likely to suffer from a cessation of war.

9. The manufacture of shell parts in this country has been attended by heavy losses on account of large quantities of product being rejected by purchasers' inspectors. Manufacturers failed to realize early the degree of precision required. The steady rise in the cost of labor and material and the loss in rejected product has robbed the war business of much of its seeming profit. The sentiment among most of the smaller manufacturers is that the "game has not been worth the candle" though as the demand continues early losses are being forgotten.

Shell parts are rejected for a great variety of defects, many of which may be corrected. Even in successful plants preliminary rejections have been made as high as 40 per cent, while corrections have reduced final rejections to 1 per cent or less. In brass work the value of scrap is so great that rejected product or partly completed work is quickly disposed of. In steel work on projectile cases accumulations of rejected product are more likely. In either case the product is not so susceptible to injury by fire or water that the temptation to burn is as great as with other and more susceptible kinds of war material. The defects also are more subject to correction. Much rejected material has found a market with lesser nations, not at war, perhaps some of those at the south. It is in most cases difficult to ascertain what material has been rejected and what has not. It would be even more difficult to ascertain this after a fire. The writer feels that danger in moral hazard is more to be feared among textile and leather workers than among the metal workers in the consideration of rejected material. Munitions stored at other points than in factory store houses or buildings where they are made should be investigated as to their real value, as rejected product has been sold in some cases to speculators.

MEASURES FOR THE PROTECTION OF PROPERTY

To meet the conditions creating the new war hazards, new measures for the protection of property have been taken. The most important of these is found in the extension of watch service. Large properties are now completely surrounded with fences of such a character that a determined effort is required to pass them, and watchmen are provided in the yard making regular visits to clock stations. In addition, uniformed armed guards patrol outside, and gatekeepers prevent the entry of strangers without proper credentials.

Attention to matters relative to maintenance of fire protection apparatus and to the general housekeeping of the plant is now, in up-to-date factories, the sole business of a fire marshal or inspector, upon whom falls all the responsibility. Where such a man has proper authority and an intelligent conception of his duty to secure effective safeguarding of the plant, ideal conditions may be realized.

Many forms of war material have been made in this country, but work pertaining to ammunition has been very widespread and large in volume.

The production of ammunition in this country for artillery use was practically nil outside of government arsenals for a long period prior to the war, and the manufacture of small arms ammunition was limited to a few concerns, making not military ammunition, but sporting ammunition, a very different product. The introduction of powder or other explosive hazards into many established risks of normally light hazard, and the lack of information concerning the hazards of the explosives used has created an uneasiness among fire underwriters. It may perhaps be said that this is founded primarily upon uncertainty as to condi-

Digitized by Google

tions, rather than upon the fear of the actual severity of the hazard involved.

While a general study of the nine major elements of risk introduced by "war business," as noted above, would be interesting and instructive, it is the purpose of this paper to outline only the more important manufacturing processes and hazards of a single branch of the war business, namely ammunition manufacture, and to trace the distribution of this work in the various classes of risk. The subject at once separates itself into two parts:

Artillery ammunition.
Small arms ammunition.

The general impression left on the writer after numerous visits to ammunition plants, is that the fire hazards other than those of the powder blending and dry houses, and the loading of fuses, are neither unusual nor severe, while the loading of fuses, when properly arranged, does not constitute a serious menace.

[Owing to limitation of space SAFETY ENGINEERING regrets that it is unable to publish in full Mr. Milne's interesting descriptions of the manufacture of Artillery Ammunition. Their completeness is indicated by the different subdivisions, viz., Distribution of Manufacture, Shrapnel, Projectile Cases, Shrapnel Shell Filling, The Shrapnel Fuse, Loading Fuse, Powder Trains, Artillery Cartridge Cases, Artillery Primers, Fulminates and Primer Loading, Storage, Blending and Drying of Black Powder. Small Arms Ammunition (Military) is discussed under the following headings: Distribution of Manufacture, Bullets, Cartridge Cases, Primers, Loading, Cartridge Clips, Powder Houses.

Extracts from the author's conclusions regarding fire hazards in certain processes are given below.—Editor.]

FORGED SHRAPNEL SHELLS

Forged shrapnel shells are required to meet certain specifications as to their physical qualities such as tensile strength, hardness, etc. To meet these conditions a heat treatment is required. This treatment varies somewhat with each batch of steel furnished but is usually as follows: The shells are heated to about 1500° F. usually in a bath of molten lead, then dipped in a bath of oil, cottonseed oil usually, again heated to about 1000° in a gas heated furnace and allowed to cool. By the latter process the hardness is drawn from the shell, thereby preventing its complete rupture when its charge explodes.

The hazards of forge shops have long been recognized and rules for their protection are well established. The construction should be of incombustible material throughout, this type of construction being superior for this occupancy to the steel trussed plank roof type even though the latter is equipped with sprinklers.

The fuel oil systems for furnaces or muffles should be installed in accordance with the standard rules, which are conceived with the idea of preventing continued flow of oil into buildings in case of broken pipes, repairs or neglected valves, and of removing to a safe distance outside and underground the main bodies of oil.

Tempering oil baths should be arranged to prevent overheating of the oil by too frequent immersions of hot metal, and should be provided with forced circulation systems by which the oil is drawn from outside reservoirs and returned through some cooling device. The baths themselves may be jacketed with a water reservoir and the water kept cool by forced circulation. Owing to the nature of the work it is frequently not feasible to provide covers which may be used to blanket a fire in the oil tank, but where possible these covers should be provided. It is desirable to have near such oil tanks a 40-gallon chemical extinguisher. This has been found effective in oil fires in tanks of small size. Where several tanks are in use they should not be placed close together in a row, but spaced as far as possible to prevent the ignition of one tank from fire in another.

Lead baths should be only in noncombustible surroundings. Tallow should not be used to prevent scum on the molten lead, charcoal being as

Digitized by Google

satisfactory for this purpose and safer.

No combustible material or construction should be near oil-fired furnaces or muffles.

In the machine shop section the construction is necessarily heavy for this class of work. Such buildings are usually of the mill type, fully equipped with sprinklers.

The hazards of the machine shop are not unusual. The proper care of a machine shop is a matter of good housekeeping. Oily waste should be placed in covered cans provided for the purpose. Chips should be removed frequently. Gasolene for cleaning should be brought in in small quantities, and the main supply kept outside in accordance with standard rules. Where lacquering or painting is done, a partitioned off room should be provided, with forced ventilation. Lacquer dry ovens should be of all metal construction. Electric wiring in lacquer rooms should be in accordance with standard rules for hazardous places.

Where there is an elaborate and expensive equipment for supplying power to hydraulic presses it is desirable to place this in a separate building or fire section, of non-combustible construction.

Machined projectile cases should be stored with a view to preventing water damage.

SHRAPNEL SHELL FILLING

The steel case of the projectile is sometimes filled in the machine shop, but more frequently under present conditions in this country at assembling plants. The reason for this is that contracts for furnishing the projectile case and the several interior parts have been sub-let to various plants having the necessary special equipment or facilities.

In filling the projectile cases the tin cup and diaphragm are set in place and one-half the charge of bullets is weighed out and inserted, one or two large spoonfuls of smoke powder are added, the powder tube set in place and the remainder of the bullets poured in. The bullets are then squeezed down into the case with a hand-operated press, the whole weighed and brought to proper weight by addition or removal of bullets. The case is then passed on to the bench where the rosin filling is done.

Various smoke powders are being used, among them antimony and aluminum powder, red amorphous phosphorus with fine-grained black powder, and magnesium and antimony sulphide. The quantities used are ordinarily small, but any storage of such material should be in detached dry locations.

The rosin filling process introduces a somewhat unusual hazard. A kettle of molten rosin is usually arranged to discharge to a secondary reservoir at the bench where the rosin is pumped into the shells. Kettle and reservoirs are usually gas-heated. Rosin once melted remains in a fluid condition at fairly low temperature.

Three hazards are recognized in this process:—

1. In heating rosin a turpentine vapor is constantly passing off. If the kettle becomes overheated this vapor may flash without the presence of an igniting flame or spark. The presence of quantities of rosin may cause this to result in a serious fire. A metal hood of ample size should be provided over both kettle and reservoir. This should have a vent with positive ventilation to outside air. The vent should be vertical through its entire length if possible, since turpentine and other substances will distill and collect on the interior surface. The vent should have ample bushing through any combustible floor or roofing. Any electric wiring inside the hood should be of the vapor-proof type, standard for hazardous places. The kettle and reservoirs should be equipped with electric pyrometers, the dials of which should be located in plain sight, and the temperature carefully regulated.

2. The presence of the gas flames in proximity to scattered rosin and ordinary combustible materials furnishes an active hazard. All benches and woodwork near should be protected with asbestos and metal. A scupper or drain of some sort from the upper edge

Digitized by Google

of the kettle should be provided to lead away to an overflow chamber any rosin that may boil over in event of overheating. Pipe connections from kettle to reservoir should be rigid, and provided with a valve near the kettle. The floor under the benches should be metal-covered, since with metal scattered rosin drippings may be scraped up. Sawdust should not be used under the benches.

3. The presence of a stock of rosin in barrels furnishes a potential hazard. Rosin should be brought in only as needed, and storage of this material should be in a location detached from any active hazards.

The filling of the powder cup is not ordinarily done in industrial plants. The process consists simply in pouring the black powder through the tube into the powder cup. The tube is loaded with quick-burning powder with a strand of guncotton drawn through.

The projectiles are shipped without the fuse attached, and a metal plug, usually of zinc or a copper alloy, is screwed into the head to protect the end and thread. The making of these plugs is a business in itself.

When the projectile case is shipped without the bullet filling a wooden plug is provided. This is called a gaine. The making of the wooden plugs has furnished appreciable business for wood turning plants.

The boxes required for shipping filled projectiles are numerous and elaborate, box factories being called upon to furnish these by the thousands.

LOADING FUSE POWDER TRAINS, ETC.

The annular grooves on the under side of the composition rings furnish the time feature of the fuse.

These grooves are filled with a very finely divided black powder compressed at about 68,000 lbs. per sq. inch. Owing to the finely divided state of the powder used, special precautions must be taken to guard against the obvious hazard in accumulations of its dust. The loading of these rings should be, and commonly is, done in specially arranged rooms.

A list of precautions to be taken:

1. Each press, with its accompanying work tables should be in a separate or partitioned-off room.

2. Such rooms should have a special seamless floor covering over all, extending up on the walls to allow clean sweeping. A trade preparation known as "asbestolithic cement" has been used for this purpose with satisfactory results. Linoleum is not as acceptable. Sheet lead has been used, but is found unsatisfactory.

3. Employes should be required to wear only rubber shoes, or shoes with rubber soles and heels having no nails.

4. The rooms are preferably to be lighted by electricity by lamps located outside the windows. Standard electric lighting arrangement for hazardous places, with no fuses or switches inside the rooms, is acceptable.

5. Power for press should be furnished by shaft from outside the room. Not more than one shaft hanger is usually necessary and this should have careful attention.

6. Heat should be provided by hot air, this being desirable as in this system the proper humidity of the room may be maintained.

7. One employe in each room should devote his entire time to sweeping up waste powder from floor and tables.

8. A covered tank partially filled with water should be provided and used to receive sweepings. The tank should be emptied daily, its contents being thrown into a stream if possible.

9. A blower system should be installed to draw the air and dust from near the jaws of the press, and from an opening near the floor, the air to be drawn through a screen chamber kept damp with steam, with the object of collecting the powder dust upon the screen. The screen should be regularly cleaned.

10. Windows of the room should be of wired glass, or screens furnished outside. This is a safety to life precaution taken to guard the danger of flying glass in event of an explosion.

11. At least two exits should be provided for each room.

12. Powder should be brought in in pound containers, and not over three

Digitized by Google

containers allowed in a room at one time.

13. Powder containers used are frequently of glass or brass, but they should preferably be of coated cardboard or rubber.

14. Rooms should be equipped with sprinklers in accordance with standard rules.

15. No matches should be carried by workmen.

16. An approved chemical extinguisher should be provided in each room, or just outside the entrance.

17. Employes should be trained to respond to fire drill.

In viewing the hazard of this process as usually found it seems that the danger of a serious explosion, such as might damage building or piping, is rather remote unless powder dust should be left to accumulate indefinitely. The danger of panic and injury to employes is rather serious, and the panic hazard contributes to the fire hazard. Flashes of small quantities of powder have been somewhat frequent, without any fire resulting. The amount of powder compressed into each ring is from 45 to 56 grains. Black powder is not ordinarily ignited by percussion or shock but in this finely divided form may explode in the air.

ARTILLERY CARTRIDGE CASES

The chief hazard lies in the fuel oil arrangements and the furnaces or muffles. These should be arranged in accordance with the established rules for such equipments.

The finishing operations consist of ordinary machine shop processes. Shells are machined and trimmed and the hole for the primer drilled and threaded in the base. No unusual hazard appears.

The cases are sometimes lacquered before being packed. In quantity production large dip tanks of lacquer are used and these should be provided with the standard safeguards. Lacquer dry ovens should be steam-heated, and be of metal construction throughout, and have positive ventilation.

The work of inspection is a prominent feature, but without hazard.

The cases may be packed with paper in heavy cartons, or in snug fitting wooden boxes if for foreign shipment.

FULMINATES AND PRIMER LOADING

Primers containing fulminates are found in the combination fuse used on shrapnel and in the base of the brass cartridge case.

The preparation and use of fulminate compounds or detonators is a new hazard to manufacturing risks, but has become more or less common since the war began.

Fulminates are powerful and unstable explosives which may be detonated by light shock or heat, and they are used with other ingredients to ignite powder trains in fuses and propellent explosives in cartridge cases.

Fulminate of mercury is most frequently used. This is made by dissolving mercury in strong nitric acid, and is in appearance a dark gray crystalline powder. It is extremely sensitive to the heat of friction and is handled immersed in water or alcohol to prevent explosion.

The hazard to life in the handling of mercury fulminate is severe. Owing to safety precautions taken the extensive damage to property by explosion is not great outside of mixing houses. These are usually small and isolated. Fire is not likely to follow fulminate explosions unless some secondary indirect hazard is set in action.

The charge in a primer consists of the detonating pellet of fulminate compound and a body of black powder. The detonating pellet contains usually less than one-half of one grain weight of fulminate compound, though in artillery primers 1¼ grains may be used.

The process and hazards of filling the small brass cups of the primers are as follows:

1. Mixing the compounds. This is done in accordance with specified formulas. Usually a small quantity, five pounds or so, of mercury fulminate, a quantity of chlorate of potash and other ingredients are kept in the mixing room, one man working. It is evident that even the smallest working quantities of fulminate in the mixing

Digitized by Google

room furnish material for a very severe explosion. There have been a number of fatal accidents connected with this process within a year. As long as the ingredients are kept properly moist there is little danger. Without question the process should be located in a small detached building built for the purpose.

The ground glass is added in the compound to furnish friction and adds materially to the hazard. The chlorate of potash is a powerful oxidizing agent. In itself, if kept free from vegetable matter, sulphur and other impurities, it offers slight if any explosion hazard. In a fire with other burning materials, it burns with an exceedingly intense heat. The quantity in the mixing house should be kept at a minimum, and the storage of quantities of it should be in a detached storehouse.

Antimony sulphide is explosive under friction when mixed with chlorate of potassium, and also alone when in a finely-divided state. It should be stored in a detached storehouse.

2. In the primer loading room the minute brass detonator cups are filled with a bit of plastic fulminate compound and covered with a leaf of tinfoil and a brass disk. The fulminate compound is served to the loading bench in small dishes containing perhaps a thimbleful. Glass dishes have been used, but rubber ones are preferable, as even this amount of fulminate if exploded would shatter a glass or china dish with possible injury to employes. Batches of loaded detonators are placed in steam-heated closets to dry them out. Such dry closets should not be located in work rooms, or where an explosion will do large damage.

3. The detonators are then assembled with the other parts of the primer, and a small charge of powder added close to the detonator itself. Certain closing disks of brass and tinfoil are added also. The primers are packed tightly and transported to the fuse-assembling rooms.

As ordinarily arranged the primer loading and assembling processes do not present a serious direct fire hazard but emphasis must be laid on the importance of the following precautions:

1. Fulminate mixing should be done only in small buildings detached from all others, and containing no other occupancy.

2. Dishes to serve workers in loading rooms should be filled only in the mixing room.

3. Detonator dry closets should be in locations detached from work rooms, and preferably in isolated buildings.

4. Primer loading and assembling should be done in one-story buildings having ample exits and provided with sprinkler equipment and standard inside protection.

5. Machines for placing the powder charge in primers should be in individual booths and powder reservoirs should be of the usual metal cone type.

6. Constant inspection should be provided and scrupulous cleanliness maintained.

STORAGE, BLENDING AND DRYING BLACK POWDER

There is an obviously severe hazard in the quantity of powder present, in the possible accumulations of dust and in the mechanical process involved.

Protection of powder blending and drying plants.

1. Such plants should be at least 100 feet from any other buildings.

2. They should be surrounded by an earth embankment or a heavy masonry wall equal in height to the buildings themselves built as close to them as possible.

3. They should be surrounded by a high, barbed-wire fence having a gate kept locked.

4. It should be the duty of one man to guard the gate.

5. Persons entering the plant should be required to put on rubber overshoes, and to leave outside any matches they may have.

6. Each division of the plant should be separated from the next by a high earth or masonry embankment. A corridor may be used to connect the various divisions. The corridor should have a door at each division and an exit at either end.

Digitized by Google

7. All floors should have a seamless covering free from nails or any gritty substance. The floor covering should be turned up on base board at the walls to allow clean sweeping.

8. Walls and ceilings should be ceiled with wall board or glazed plastering, such as will allow them to be cleaned of dust.

9. Heat should be by hot air from a room where no powder is present.

10. A complete equipment of automatic sprinklers should be provided.

11. A complete equipment of open sprinklers inside the building in addition to the automatic sprinklers should be provided. This should be controlled by a quick opening valve located near the main entrance or in the gate house.

12. Electric light and power equipment should be in accordance with the standard rules for hazardous places.

13. No firing testing of powder should be done in this plant.

14. A sweeper should be constantly at work.

15. Shaft bearings should receive routine attention.

16. Dry closets should be cleaned daily.

17. Special care should be taken to bush any steam pipes through wood work.

18. Roofs and sides of the buildings should be covered with non-combustible materials.

POWDER HOUSES

Smokeless powder of compositions containing either nitro-cellulose or nitroglycerine is used for military rifle cartridges. Unlike black powder, atmospheric dampness does not affect this powder. Unconfined it does not burn as rapidly as black powder.

Smokeless powder is blended to secure uniform burning qualities, but drying is not required.

Storage of large reserve stocks of powder is in isolated powder houses. Considerable quantities must be kept at a point convenient to the manufacturing operations. Where ample land is available blending rooms and service rooms may be located about 200 feet distant from manufacturing buildings, without protection. If closer than this, these rooms should be surrounded by earth embankments.

Blending may be done by filling several tanks, each with a different quality of powder and drawing from all into another tank in such a way that the mixing occurs in the process. Mixing by means of tumbling barrels might be used, but this method was not met with where smokeless powder was handled.

No air conditioning apparatus is required for smokeless powder handling rooms, nor is any drying done. Powder rooms are usually steam-heated.

The construction of powder work rooms is usually of a very light character, which is desirable. No special floor covering is used but it would seem desirable to have both tight smooth floors and smoothly-ceiled walls and ceilings.

Smokeless powders are frequently covered with polish of graphite, and in blending rooms the dust from this is evident, being suspended in the air, in some degree.

HAZARDS OF POWDER AND FULMINATES

The following remarks on gunpowder or "black powder" as it is frequently called, are copied in substance from Von Schwartz's Fire and Explosion Risks: In itself gunpowder is less explosive than inflammable, but detonates. Under certain conditions (in a confined space) it may also give rise to very violent explosions. It consists mainly of 75 per cent saltpetre, 10-12 per cent sulphur, 12-16 per cent charcoal. It ignites at 270°-300°c, generates a temperature of 2200° and a pressure of about 600 atmospheres, and the resulting gas will occupy 280 times the volume of the original powder. It is ignited by friction or percussion. Loose masses are not always ignited by lightning, but always if tightly packed.

Smokeless powder as used in military ammunition consists of nitro-cellulose either with or without nitroglycerine, and small quantities of other substances. When unconfined it burns only with moderate rapidity, not flashing as does black powder. It detonates when confined, either by the flash and

Digitized by Google

shock of a fulminate or by severe heat. It has a tendency to decompose under the action of long continued moderate heat, in which case an explosive gas is given off. On account of its slower burning qualities when unconfined it presents less hazard than black powder.

On Fulminates, Von Schwartz's "Fire and Explosion Risks" contains the following remarks: "If water or other liquid with which a fulminate has been mixed is spurted about and the drops left to dry, the slightest residual traces of the fulminate will explode of themselves; the greatest violence being exhibited when they are exposed to the rays of the sun. Even the dust swept up in fulminate works has a tendency to explode spontaneously."

Railroad Safety Committees

By G. B. Cooley

Pittsburgh & Lake Erie R. R., Pittsburgh

ACCIDENT prevention is successful in so far as it eliminates the causes or conditions to which accidents are due. By safeguarding machinery and dangerous locations we may eliminate a large percentage of injuries received by persons blameless for these conditions. This line of work is purely mechanical, and while of enormous benefit, we still have accidents occurring continually that emphasize the fact that the system of mechanical protection is only a step toward the attainment of high efficiency in accident prevention work.

We have among us the careful and the careless; the careful we need not consider, as the careless and indifferent are those for whom the next step must be taken, and, as we assume all mechanical appliances to be complete, it will be necessary to use other means to reach those who need assistance, for their own personal protection, as well as for the protection of those who may suffer from their careless practices. Carelessness is probably a habit of not concentrating the mind on what is occurring physically and the problem that is to be solved is how to overcome this fault and assist in the acquirement of the "Safety First" habit.

Some influence must be brought to bear that will bring a realization of the necessity for carefulness and can best be done by a thorough instruction of "Safety First" rules.

This brings us to the purpose of safety committees, the members of which, by coming in personal contact, can impress the necessity of carefulness, and by persevering along this line create improvement, as all workmen will be brought to realize that "Safety First" is not a "fad," but something that will be a requirement in the future, as much so as ability to perform duties assigned. It is important that this movement have the respect for those for whom intended and all persons engaged or interested should attempt to arouse as much enthusiasm as possible, avoiding all spasmodic efforts or any action that might be detrimental to "Safety First" influence.

Advice should be given to those newly employed or ignorant of "Safety First" practices, and demonstrations showing results of carelessness are always of great value. The careless should be cautioned regardless of personal feeling or prejudice, for finally after this period of education will come a strict enforcement of "Safety First" rules.

In the "Safety First" work we have conditions similar to those of the Government in its sanitation of Panama. The object of each is to save lives and the course of procedure is almost identical, for sanitation was first made possible, then the education of necessity for sanitation, and then strict enforcement of sanitary rules.

There is no work that is more humane in principle.

Digitized by Google

Central Safety Stations in Coal Mines

By H. M. Wilson

Director of Department of Inspection and Safety, The Associated Companies.

THE application of the Workmen's Compensation Act passed by the Pennsylvania legislature to the coal mining industry created a condition which has aroused mine operators to a new threat to their financial solvency. A business depression or a strike could not have produced the same feeling of unrest as did the realization that an injury to a mine worker, much less a mine catastrophe which might kill many workers, constitutes a charge against the earnings of the mine which might spell financial failure. Under the older forms of liability legislation the injured had to sue and perhaps ultimately compromise on a mere pittance. Under compensation legislation the mine operator must be prepared to pay perhaps $3,000 or $4,000 per individual killed or permanently injured, a sum which for a moderate-sized mine might aggregate a half million dollars.

The legislation enacted by Pennsylvania, fortunately, is one of the very best compensation acts passed in any State, and provides that the State Department of Insurance shall assure that the workmen shall receive the compensation contemplated by the law, and to this end rules were established requiring the filing of certain bonds, equivalent to the pos-

Side View of Motor Truck Used by the U. S. Bureau of Mines Rescue Corps, Showing Doors Open

Digitized by Google

Interior of Mine Rescue Car No. 1, Showing General Arrangement

sible losses to be incurred, or the insuring of the risk with a reliable carrier, and as a further safeguard in this respect, the State Insurance Fund was authorized.

The difficulty experienced in Pennsylvania, as in other States, was, however, that neither the State Fund nor any insurance company, however sound, was willing to underwrite such a hazard as that of coal mining at rates which would not seem extortionate.

It happened, fortunately, at this juncture, that a group including ten of the oldest and most stable stock casualty companies, realizing that they must continue to do business in Pennsylvania in other lines of industrial insurance than coal mining, felt it incumbent upon them to show that stock insurance could meet even such a condition as this. Wherefore, they joined together as The Associated Companies, pooling their interests somewhat on the principle of the Lloyds of England, for the underwriting of coal mine risks on a modern principle known as merit-rating.

The value of inspection and safety advice against fire risks had long been known and successfully applied, first through the splendid work of factory inspection in New England, and in the broader field through the work of boards of fire underwriters and of the Underwriters' Laboratories in Chicago. A Department of Inspection and Safety was organized by The Associated Companies, the purpose of which is to insure coal mines in any State of the United States, and to merit-rate, i. e., give a preferential reduction or increase in the rate established for coal mines in any State, which merit rate should consider the safety condition of the particular mine. The inspector makes a report of each element found in the mine which goes to make it more or less safe than the average mine, and accordingly the total credits or charges against a mine may indicate that that particular mine may get

Digitized by Google

Rescue Crew of Bureau of Mines Entering the Smoke at Experimental Mine After Explosion Test

a rate far above or below the average.

The effect of this system is twofold. It encourages the mine operator to make his mine more safe, giving him, as an incentive, a substantial reduction in his premium rate. Thus, in Pennsylvania, where the rate for insurance of a bituminous mine is $3.83 per $100 of payroll, a mining company may have an annual payroll of $1,000,000, thus requiring the payment of a premium of perhaps $38,300 per annum. By the adoption of proper safety measures this rate may be reduced by $15,000, thus cutting the annual premium payment from $38,300 to about $23,300—a substantial saving of $15,000, or nearly one-half. This system appealed strongly in its opportunities for good to the Department of Labor and Industry, the State Insurance Department and the State Fund of Pennsylvania, all of which immediately showed a desire to encourage and cooperate with The Associated Companies in their efforts to protect the mine operators by insurance in proportion to the mine operator's effort to improve the safety condition of his mine.

Nor did it take the mine operator long to appreciate the advantage of such a system, and the result is now evident in the splendid co-operation of the mine operators of Pennsylvania in their efforts to do everything they can to safeguard their workmen, as shown by recent second inspections made of the condition of their mines.

The mines of Pennsylvania, within the period of a few months, have introduced safety measures and safeguards to their workmen which represent an increase in the safety of the workmen of 25 per cent to 40 per cent. This means that whereas eight or ten years ago there were killed in Pennsylvania 4.81 miners per 1,000 of workmen, this ratio had gradually been reduced, as a result of the propaganda of the Federal Bureau of Mines and of the improvement of the inspection work of the State Bureau of Mines, until in 1915 the fatality rate was only 2.95 men per 1,000.

In the first six months of 1916, since the Workmen's Compensation act went into effect last January, there has resulted from the safety inspection and merit

Digitized by Google

Exterior View of the Illinois Mine Rescue Station at La Salle, Ill. Rescue Car at Left

rating of mines for insurance, and the efforts of the mine operators to make their mines more safe, a further improvement in their safety conditions, which promises a reduction of the fatality rate to about 2 men per 1,000.

Not only has an improvement of the safety condition of the mines been effected in the immediate present by the adoption of such safeguards as improvements of haulage ways, improvement in the use of explosives, improvement in the ventilation, and so on; but, what is even better, improvement is assured for the future in the organization for safety in and about the mines. This is the most difficult to accomplish by the mine operator, because it calls for his personal attention. He needs must imbue his subordinates with the crusader spirit, which will make every workman more careful and less negligent, and will give him a better appreciation of the money value of accident prevention to himself and his associates. It means better inspection by more skilled mine officials, education of the miners by lectures and by training in first aid and in mine safety, and an effort for betterment which will result in fewer accidents and increased earnings.

In this respect the greatest stride made in the direction of improvement for the future has just been made in the perfection of an agreement among a large number of the most progressive mine operators in Cambria, Clearfield and neighboring counties in central Pennsylvania for the establishment and maintenance of Central Safety Stations in coal mines. This movement was inaugurated chiefly through the efforts of General Superintendent E. C. Brown, of the Pennsylvania Coal & Coke Corporation at Patton, Pa., and of Rembrandt Peale at St. Benedict, Pa. It has resulted in the establishment of three central safety stations, one each at Barnesboro, Philipsburg and Portage; each within, at the most, two hours of the mine which it serves; each station in charge of a man skilled in mine safety and in mine rescue and first aid to the injured, equipped with modern mine rescue and safety apparatus. Each station becomes thus at once a center for training and education of miners regarding the dangers of their employment and the means of preventing accidents. Among the mine operators first to sign the agreement for the establishment of

Digitized by Google

Rescue Station and Safety Department of the Copper Queen Consolidated Mining Company, Bisbee, Ariz.

these co-operative stations are some of the best known in central Pennsylvania, and include the following:

Altoona Coal & Coke Co., Altoona, Pa.
Ghem Coal Co., Osceola Mills, Pa.
Hale-Ladysmith Coal Co., Houtzdale, Pa.
Thomas J. Lee, Philipsburg, Pa.
Hastings Coal & Coke Co., Cherrytree, Pa.
Patton Clay Mfg. Co., Patton, Pa.
Binder Coal Mining Co., Inc., Carrolltown, Pa.
Milsom Coal Co., Carrolltown, Pa.
Red Top Coal Co., Hastings, Pa.
Glen White Coal & Lumber Co., Glen White, Pa.
Taylor & McCoy Coal & Coke Co., Glen White, Pa.
Dixonville Coal Co., Johnstown, Pa.
Riverside Coal Co., South Fork, Pa.
Ramey Coal Co., Ramey, Pa.
Madeira Hill Coal Mining Co., Philipsburg, Pa.
Lilly Coal Co., Altoona, Pa.
Sonman Shaft Coal Co., Sonman, Pa.
Plymouth Coal Mining Co., Portage, Pa.
Watkins Coal Mining Co., Barnesboro, Pa.
Watkins Coal Co., Barnesboro, Pa.
Heverly Coal Co., Altoona, Pa.
Guion Coal Co., Inc., Philipsburg, Pa.
Clark Bros. Coal Mining Co., Philadelphia, Pa
Electric Coal Co., Philadelphia, Pa.
H. E. Clark, Philadelphia, Pa.
E. J. Goodyear, Munson, Pa.
Clear Creek Coal Co., Altoona, Pa.
W. H. Piper & Co., Lilly, Pa.
Clymer Brick & Fire Clay Co., Clymer, Pa.
Lane Coal Co., Inc., Philipsburg, Pa.
South Fork Coal Mining Co., Philadelphia, Pa.
Bulah Shaft Coal Co., Ramey, Pa.
Bulah Coal Co., Ramey, Pa.
Dexter & Carpenter, Inc., New York City.
Lloydell Coal Mining Co., Lloydell, Pa.
Leland Coal Mining Co., Becarria, Pa.
Dexcar Coal Mining Co., Ashville, Pa.
Sterling Coal Co., Philadelphia, Pa.
W. L. Irish & Co., Philadelphia, Pa.
Hatfield & Hilles, Philadelphia, Pa.
Oak Ridge Coal Co., Hastings, Pa.
Pennsylvania Coal & Coke Corporation, New York City.
Logan Coal Co., Philadelphia, Pa.
Tunnel Coaling Co., Gallitzin, Pa.

Digitized by Google

Tunnel Coaling Co., Saxman, Pa.
Tunnel Coaling Co., Shanktown, Pa.
Tunnel Coaling Co., Nettleton, Pa.
Argyle Coal Co., South Fork, Pa.
Mountain Coal Co., Dunlo, Pa.
J. Edward Horn & Co., Philipsburg, Pa.
Conquest Coal Mining Co., Philipsburg, Pa.
Superior Coal Co., South Fork, Pa.
Hillsdale Coal & Coke Co., Glen Campbell, Pa.
Beaver Coal Co., Patton, Pa.
Lenox Coal Co., Hastings, Pa.
A. M. Riddell, Altoona, Pa.
Forge Coal Mining Co., Altoona, Pa.
Cymbria Coal Co., Altoona, Pa.
Urey Ridge Coal Co., Altoona, Pa.
Morrisdale Coal Co., Morrisdale Mines, Pa.
Cunard Coal Co., Morrisdale Mines, Pa.
Ashman Coal Co., Philipsburg Pa.
N. J. Huether, Hastings, Pa.
Empire Coal Co., Clearfield, Pa.
Estep Bros. Coal Mining Co., Garmans Mills, Pa.
Derringer Bros. Coal Co., Spangler, Pa.
Woodland Coal Co., Spangler, Pa.
Rembrandt Peale Interests, St. Benedict, Pa.
H. B. Scott Coal Co., Philipsburg, Pa.

Much credit is due to these men, who have blazed the way in a very difficult undertaking, one which has involved much personal work and an interruption to the ordinary routine of the management of the various mines which have entered upon this enterprise. Their example is being rapidly followed, and mine operators in western Pennsylvania are already joining together in the establishing of central safety stations similar to those in Cambria and Clearfield counties, one on the Monongahela river near Brownsville, in which are interested the operations of the Orient Coal Company, Tower Hill Coal Company, Thompson-Connellsville Coal Company, Brier Hill Coal Company, and Union-Connellsville Coal Company. Another group is on the Allegheny river, above Pittsburgh, and includes the mines of the Ford Collieries Company, the Allegheny Coal Company, Bessemer Coal & Coke Company, and the Superior Fuel Company.

This is an undertaking which means much for the good fame of Pennsylvania, and will redound to its credit as a State in the forefront of those which lead the way to greater safety and better working conditions, and greater wealth to the man who labors.

National Safety Council

Secretary Cameron's Third Report of Progress

THIS is the third report of progress. The safety idea has been marching with seven league boots. The safety movement started only a decade ago, but the optimistic, progressive and enthusiastic American spirit has never been so well demonstrated as in this national effort to conserve human life.

Professor Roscoe Pound, of Harvard University, voiced the spirit of the social movement when he said, "The greatest thought of this century is the transference of value from property to the human being." The emphasis of thought and effort has been until recently, upon the efficiency of machines and equipment, today we have a great awakening in the conservation of the life and health of the individual. Literally, hundreds of agencies of great power and influence are doing their very utmost to make America a safe country to live in. Federal and State agencies, insurance companies, thousands of public utility, industrial and railroad companies and associations are utilizing every atom of their influence to remove danger and instill the habits of caution. A steel company member of the Council reports that with 4,000 men at work (the output at 20 per cent over capacity)—but every man constantly inspired with the safety idea—only one workman has lost time from accident causing more than seven days' absence from work. Many other companies are getting as good results from their safety work.

The National Safety Council has been

Digitized by Google

the means and is doing more than any other single agency to spread the safety idea throughout the United States, Canada and foreign countries.

THE RECORD FOR 1915-16

This fiscal year has a record of more new members and activities than any two previous years of the Council's life. You will remember the Council started work in October, 1913, with $1,400 and 40 members. At the end of June, 1914, there were 731 members; at the end of the second fiscal year, 1,211 members. The cancellations during the current fiscal year were 192. The Council gained 1,102 new members this year, or an increase of 91 per cent over last year's record. The present membership is 2,120 with over 10,000 representatives and 3,500,000 employes.

The financial statement will show the income from dues to have been almost $50,000 for the year, with a surplus of cash and unpaid dues of over $4,600. The income for the calendar year, 1916, if the average for the first seven months is maintained, will approximate $70,000.

THE COUNCIL'S ACTIVITIES

Five service and bulletin board bulletins have been sent out regularly each week and the special safety bulletins of the sections are developing satisfactorily. It is impossible to measure the influence of this direct method of reaching the general public. Newspaper and magazine safety publicity is lost in a multitude of other miscellaneous subjects, but the Council bulletins reach every department of the industrial member's shop.

Some of our members are putting the bulletins on public bulletin boards. This constant educational hammering at the individual with the causes and remedies for accidents, week by week, month by month, year by year, will make a mental impression which will undoubtedly be reflected in his actions.

This weekly audience, as shown by the applications for membership forms, is now over 3,500,000.

Last year the annual congress was attended by over 1,700 representatives of the Council—15 sections were organized, the exhibit was a splendid one, the meetings were all well attended. The Council spent $6,000 on the congress, including the publication of separate reports of the sectional meetings and a book of 771 pages containing the full proceedings.

Twenty local councils have conducted regular meetings, safety rallies, inspection of plants, attended to local publicity, etc.

The various sectional officers and committees are entitled to unqualified praise for the enthusiastic manner in which they have organized their work, including the preparation of bulletins, preparation of leaflets on safe practices, and for the annual congress to be held in October next.

The Council's information bureau is now well organized and includes every book, report and collection of data which it has been possible to secure. It is at present in charge of two librarians. A large shipping department has been established, outside of the headquarters of the Council, from which many thousands of packages are handled yearly. This, in part, represents our effort to supply data requested by our members.

Special and traveling exhibits, safety meetings in the plants of members, the new series of "Safe Practices Information Leaflets," co-operation in establishing a National "Fire Prevention Day," the constant promotion of the sale of the "Sure Pop" book, the work of the new committee to promote safety education in the schools, and the new plan for home safety membership and service, and the dozens of other specific activities pushed forward by the Council, day in and day out, testify as to the need for a national clearing house of information and for the co-operative effort which is being made by the members of the Council to learn how to prevent accidents, to educate safety committees and the public as to the real facts connected with needless accidents, and to continually propagate the safety idea and make it an integral part of American life, and an influence in every nook and corner of the country.

Your Council is endeavoring to spend every cent of its income in the wisest and most effective way possible; each

Digitized by Google

new membership means more power in the organization and provides means for greater work. The staff at headquarters is being added to just as quickly as means are provided. A traveling secretary has been engaged to start work September 1; the staff now includes an editor of splendid qualifications, and, through the hundreds of safety engineers serving on committees, the Council's work is marching on in a permanent, incisive and constructive manner.

The United States is to be congratulated on the spirit which made possible the National Safety Council. Its public spirited members, the hundreds of splendid young men who are doing so much constructive work silently and effectively, are entitled to the greatest praise.

Let us administer our affairs with hope and courage—make our next year twice as good as the last—and come together in October at the annual meeting with the determined purpose to give the nation another lesson as to the valor and determination of its citizens in their endeavor to discourage and wipe out accidents in the industries, in public places, and in the homes.

Dangers from Oil Lanterns for Emergency Use

FROM the safety inspector of a Cleveland, Ohio, Company:

"It is customary in certain locations at some of our properties to maintain oil lanterns for emergency use in case electric light service is interrupted from any cause. It seems to be the opinion of some of our people that an oil lantern or lamp which has not been used for considerable time is liable to explode when lighted. Can you furnish us with any definite information relative to this? If so, we will greatly appreciate it."

COMMENTS BY "SAFETY ENGINEERING"

There is considerable basic foundation for such opinion, assuming, of course, that kerosene lanterns are intended, and that "explosion" includes flare, for actual explosions of kerosene oil lamps or lanterns are uncommon.

The explanation is to be found in the condition of the lamp or lantern, remembering that, in general, long disuse produces essentially the same final condition that neglect does in a lantern in use.

The lanterns are for "emergency use" and therefore are to be taken and used without any time for overhauling and, as a rule, are in unsatisfactory condition to some extent at least.

Capillary attraction, which causes the oil to rise in the wick, continues to act after the flame is extinguished, although with less energy. Under certain conditions it will not only cover the lantern font with an external film of oil, especially the invisible parts of the burner, but there will be plenty of dust, oil saturated.

A kerosene oil lantern *full* of oil *cannot* explode. Only the vapor of kerosene mixed with air is explosive, and such explosive vapor is not given off until the temperature of the oil passes 100 degrees. But parts of the burner heat quickly beyond that point and if oily, externally, soon give off ignitible vapors which flash back from the flame and ignite the film of oil—generally within the burner. This sets up a flare which quickly heats the font beyond that point (ordinary rooms are kept at 65 degrees to 75 degrees and only 25 to 35 degrees *increase* is needed). If this flame reaches the vapor in a partly empty lantern or metal parts in contact are heated beyond about 650 degrees, an explosion is likely to follow. An absolutely clean, well-trimmed and well-filled lantern cannot be exploded.

The danger may be minimized by trimming and filling each lantern before putting aside, being sure that all parts—especially interior parts of the burner—are perfectly clean and the top of the wick *a little below* the *top of the wick tube.*

Digitized by Google

Lanterns in this condition when put away, if kept in a "dust proof" cabinet, are likely to be found in good shape even after remaining unused for many months. If there is suspicion of dust reaching the lamp better wrap each tightly in paraffined paper so tied as to exclude air (and dust).

Then before using, cut away ⅛ inch from the top of the wick—whether previously used or not this is to be observed.

If the lantern was in proper condition when put away, it ought, when so wrapped, to remain so for a long period. If it is not found clean and full it is prima-facie evidence that it was put away in poor condition. Dust, however, will in due time bring about unsafe conditions in a lamp perfectly clean when laid aside, and as it is practically impossible to absolutely exclude dust there is consequently a limit of the time unused lamps may be left unexamined.

Thus with every possible precaution observed such lamps should be examined at least once in three months.

Of course, some of the hazard depends upon the average intervals of use, but it is the unclean lamp that is hazardous, the partly filled lamp and the lamp whose wick (the flame end) is dust clogged.

In explanation of the action of dust, the minute particles absorb oil and thus increase the volume of a possible film and also act much in the same manner as a wick (capillary attraction exerted superficially), while a wick whose end is dust clogged does not pass oil to the flame properly, but forces it to take a path out through the side of the wick, which in turn heats the burner more rapidly and to a higher degree. This is why a long exposed wick often requires to be turned up higher in the lamp.

The construction of the burner has much to do with conditions. Some burners soon become actually dangerous, while others do not readily become so. If a burner has an ordinarily invisible or uncleanable cup or rim about the base of the wick tube it may be at once placed in the first group.

The Real Meaning of "Safety First"

By John Annal

Safety Inspector, Aetna Life Insurance Company, Chicago, Ill.

LACK of appreciation of what "Safety First" means and the failure of its application to small things result in more serious accidents during a given period than one has any idea of. Liability insurance companies have statistics proving this to be a fact.

The common ladder is an instance. It is reported that fully 6,000 deaths have occurred in the United States caused by ladders slipping, or falling from ladders due to their slipping. These 6,000 lives would have been preserved had the ladders been set at a proper angle or if spikes or other non-slip devices had been placed on the lower ends.

Seventy-four accidents during March and April, 1916, recorded by one insurance company in one of its branch offices alone, were due to falling objects. Suspended dunnage floors and racks are common in all business places. One can find [illegible] in the grocery, in the department store and even in the cigar store, though they are most common in the larger manufacturing establishments. Some of these floors are equipped with stationary stairs or ladders. Others with portable means of reaching them. Some are equipped with makeshift railings and some have no railings at all. All are found to be a convenient place to "lay things." No thought is given to the possibility of the "things" falling off on the person of the unsuspecting employe or passerby. A toeboard from four to six inches high along the floor line of these elevations and wire mesh screen railings would have averted 74 accidents.

During the same period 66 accidents were reported as due to flying objects; 60 of these were eye injuries. How often

Digitized by Google

have any of the readers had occasion to be around a boiler shop or an iron-working plant and watched the "chisel bar gang" cutting off rivet heads? Have you ever seen the guard screen in use at such a time? No, you have not and neither have I.. If that simple precaution is taken there will be no accidents due to flying rivet heads.

During the months of March and April of this year 36 accidents due to stepping on nails are recorded. The common nail is a harmless looking article, but, like the snake, avoid treading on it. Why nails are permitted to litter floors and passageways is beyond the ken of the writer. Yet one can go through the shipping rooms, warerooms and workrooms of 50 plants and 40 of them will have the floor littered with loose nails, nails protruding through boards, or both, and if one is very "nosey" and observes the shoes of the workers, he will see that every pair of them is "along the lines of least resistance"—inviting an attack.

Forty-four trucking accidents are recorded for the two months noted. These accidents, 8 of them serious, were due, in a measure, to the truck hands going in one direction while looking in the other. This reminds the writer of a little incident that happened in a wholesale dry-goods house in his city. A salesman was going through an aisle with an assortment of packages piled on his arm which seriously obstructed his range of vision. A cross-eyed trucker was coming along the same aisle pushing a loaded truck. The two met with the result that the packages no longer remained on the arms of the salesman. The trucker was highly indignant when one of the packages hit him, and he blurted out, "Why don't you look where you're going?" to which the salesman modestly replied: "That's all right, Jim, but why don't you go where you're lookin'?" Ordinarily, the common warehouse truck is not a machine to fear. It has no open gears to enclose; no fast running belts to guard. It has no teeth, consequently there is no occasion for a muzzle; yet 44 accidents in two months is the result of careless handling of the warehouse truck.

Defective flooring claimed 18 victims in the given period, two of them serious accidents. Yet one can enter any number of business places, stores and factories included, and observe 50 per cent of such places with defective flooring—some of them are dangerously so. There is absolutely no excuse for conditions of this kind.

Piling material, not to be outdone by the foregoing, totaled 17 accidents for March and April, one of a very serious nature. Seemingly little thought or care is exercised in the piling of material. This is observed in wholesale grocery houses, paper warehouses and similar establishments. Ask the foremen why this is so and they will tell you that their goods "move quickly." The writer fully agrees with them. It moved altogether too quickly for the good of 17 men who were injured. All goods, no matter of what nature, should be piled interlocking.

Five hand crane handle accidents were due to operating the cranes with the ratchets thrown back.

Twenty-two men were struck by hammers. No, gentle reader, not by steam nor trip hammers—just common, every-day hand hammers, and not in the hands of the "non-professional carpet layer" either, but handled by supposed mechanics. Ten of them nursed nailless fingers as a result.

"Safety First" means exactly what it spells. There must be no "rare" nor "medium," but a "well done," "hard boiled" "Safety First." Do not be like the old Indian who, when asked by the missionary if he said his prayers regularly, replied, "Umph, me no want pray too much. If Great Spirit take care of White Feather when asleep, White Feather he take care of himself when he awake." The factory, the warehouse and the retail store should not be asleep, waiting until an accident occurs, or until some outsider points out defects. They should be "up and doing," attending to little and big things alike. "Safety First" is here to stay; there is no getting away from that fact. There is no doubt that the average workman disregards two of Nature's important laws in his every-day duties—namely: "self preservation" and "prevention better than cure." Is his employer doing his share in the prevention of accidents? Wake up, Mr. Employer. "Safety First" is coming toward you. Better meet it half way!

Digitized by Google

The Power to Order Structural Changes in New York Factory Buildings

IT seems that the fire commissioner is not empowered by law to require the making of structural changes in factory buildings, according to the recent decision of Justice Giegerich in the matter of the application of William H. Browning, of Browning, King & Co., for a peremptory writ of mandamus directing Fire Commissioner Adamson to rescind and cancel a fire prevention order requiring the fireproofing of a light shaft in the building No. 16 West 57th street, Manhattan, which is used for light manufacturing.

The decision is important in that it squarely places complete responsibility upon the labor department for all structural matters in factory buildings, including specifically the fireproofing of light shafts and, by inference, of elevator shafts, stairway enclosures and all other vertical openings in such buildings.

For several years the fire department has assumed and exercised jurisdiction over many features of factory construction, particularly of the fireproofing of their elevator and other shafts, stairways and the like. It now appears that the countless inspections and myriads of orders made by the fire department on this account were without lawful authority. These unlawful encroachments upon the jurisdiction of the labor department no doubt contributed largely to create the condition of chaos which impelled local real estate interests and those concerned for the safety of factory workers to unite and secure the enactment of the Lockwood-Ellenbogen bill.

Not the least notable feature of Justice Giegerich's decision is the stand taken therein against the evils likely to result from the assumption of concurrent power over the same subject by two different bodies or officials. The justice refused to construe the legislation under consideration as intended to effect such an undesirable situation, which he no doubt recalled as having been the major factor in causing the "Asch Building" fire of 1911, wherein 150 persons perished.

The full text of the decision:

SUPREME COURT, NEW YORK COUNTY, SPECIAL TERM, PART 1. GIEGERICH, J.

IN THE MATTER OF BROWNING. The applicant seeks a writ of mandamus to command the fire commissioner of the City of New York to cancel an order requiring him to enclose in fire-resisting material a light shaft in his factory building located at No. 16 West 57th street, in the Borough of Manhattan. The order is sought to be supported as within the authority conferred upon the commissioner by chapter 12, art. 2, sec. 20, of the code of ordinances of the City of New York, and it would seem that the power to make such an order is conferred by that ordinance (see Lantry v. Hoffman, 55 Misc., 261, aff'd 124 App. Div., 937).

On behalf of the applicant it is argued that the provisions of the Labor Law are now exclusive on the subject. Reference is made in support of this argument to People, &c., v. Willcox (200 N. Y. 423), where, at page 434, the Court of Appeals pointed out the evils likely to result from the vesting of concurrent power over the same subject in two different bodies or officials. In that case the court refused to construe the legislation under consideration as intended to effect such an undesirable situation. Keeping that principle of construction in mind, I now come to a consideration of the meaning of section 79-d of the Labor Law which provides as follows:

> "Effect of foregoing provisions; inspection of buildings and approval of plans —1. Effect of foregoing provisions. The requirements of sections 79-a, 79-b and 79-c are not in substitution for the requirements of any general or special law or local ordinance relating to the construction, equipment or maintenance of buildings, but the provisions of such general and special laws and local ordinance shall be observed as well as the provisions of said sections. The provisions of sections 79-a, 79-b and 79-c shall supersede all provisions inconsistent therewith in any special law or local ordinance, and any provision of law or ordinance which gives power to any officer to establish requirements inconsistent with the provisions of such sections or the rules and regulations adopted by the industrial board under the provisions of this article." . . .

Now it seems to be clear that the ordinance

Digitized by Google

above referred to (chap. 12, art. 2, sec. 20) does give power to the fire commissioner of this city to establish requirements inconsistent with the rules and regulations covering the same subject that may be adopted by the industrial board under the provisions of that article. It is true that there is nothing in this case to show that there is any conflict or inconsistency between the order of the fire commissioner and any rule or regulation so far adopted by the industrial board, but this makes no difference. The section just above quoted is not limited by its terms to a case where some officer has established requirements inconsistent with the rules and regulations of the industrial board, but it applies to the power to establish such requirement, and if such power is given by any other provision of law or ordinance, then such provision is superseded by the sections of the Labor Law above referred to. The motion is therefore granted, with $50 costs. Settle on notice.

(N. Y. Law Journal, Aug. 1, 1916, p. 1507; Giegerich, J.)

It is understood that it is the intention of the fire commissioner to appeal the case.

A Woman's View of "Safety First"

THE following article appeared in *The Anode,* the publication of the Bureau of Safety of the Anaconda Copper Mining Company. The article was written by the wife of an employe of the company's Boston & Montana group of mines:

"There can be no doubt that the wives, mothers, daughters and sisters of the persons employed by the large corporations of the country are very grateful for the interest which these corporations are showing in the 'Safety First' movement, which is being so generally discussed and studied at the present time. It certainly lessens our anxiety to know that every effort is being made to safeguard all employes from accident and to teach them the value of carefulness, and that though an accident does occur, there are men at hand who have been trained to care for the injured, thus lessening suffering and oftentimes saving life.

"The 'Safety First' movement has gone further than merely installing safeguards and training men in first aid work. In many factories it is leading to the betterment of all working conditions, such as providing good ventilation, good light and healthy sanitary conditions, in fact it is their aim to improve every condition, which will make for the better health and efficiency of employes.

"But are we, the women and home makers of the country, to let our interest stop at being grateful? Can we not do much by co-operation in this movement? Eight hours of the 24 is the usual time which the employes spend at the factory, while the other sixteen are spent in the homes or elsewhere. Therefore, should we not make a great effort in seeing that all conditions of the home and community, which pertain to the health and safety of its occupants, are bettered, if possible?

"By glancing over almost any daily paper, we can readily see that a great per cent of all accidents happen in the home,—this is especially true in the case of children under school age, and practically all such accidents are the result of neglect or careless practice. Therefore, should not we, as well as the heads of factories, railroads, etc., give study to this subject?

"Of course some accidents in and about the home would seem to be unavoidable, but here we have the opportunity to accomplish much, if we have some knowledge of first aid work. Few mothers know how to properly dress or bandage a wound or the right method of helping or handling an injured person. Therefore, would it not seem timely that we, as wives and mothers, make an effort to co-operate in this movement, and in some way to become familiar with the teachings of 'Safety First' and the 'practice of first aid?'"

Digitized by Google

EDITORIAL

Pennsylvania Accidents

A STATEMENT for Pennsylvania shows that during the first seven months of compensation there have been approximately 150,000 accidents coming under the provisions of the act. That is an average of over 20,000 accidents a month—a revelation, no doubt, to many employers in the State. The total number of fatalities covered by the act during the same period was 1,336, which is at the rate of approximately 2,300 per year, or approximately 8 industrial workers killed every working day, in one State alone, and many other accidents of a more or less serious nature. As compensation for these accidents, the insurance carriers are now paying claims totaling $1,800,000 with a maximum single claim of $6,800. These figures should inspire liberal appropriations on the part of the individual employer for the elimination of all possible hazards, and it is to be hoped that the employer will not shirk his responsibilities to his employes and to himself.

The Most Serious Fault

MORE common than stupidity, more disastrous than incompetency, more prevalent than meanness—carelessness.

Most railway accidents are due to carelessness on the part of some one. Most automobile accidents are due to the carelessness of the driver and practically all the rest are the fault of the victims. Did you ever notice how many persons will stop in the middle of a street crossing to admire the landscape or to hold a heart to heart talk with a friend? Drivers of cars can tell you about it.

But the number of persons who lose their lives through carelessness is infinitely smaller than the number made miserable through the same fault.

A certain young man had several narrow escapes from seriously injuring himself, and other escapes from seriously injuring others through pure thoughtlessness. He was naturally unobservant and inattentive. Finally he lost a good position by a bit of raw carelessness which endangered the life of his employer. The man was a good friend of the young fellow, but said he no longer dared expose himself and his property to such hazards.

This set the young man to thinking. Since that time he has constantly and relentlessly fought his besetting sin. He has cultivated his powers of observation, thoughtfulness and attentiveness. He is now a fairly successful man, but he says he would have been good for nothing if he had not grappled with his evil traits. Occasionally they reassert themselves to his confusion and injury, but as a rule he is the master and has reason to be proud of his victory.

Let us hope that many men have disciplined themselves in a similar way. One thoughtless moment may cause an accident that will bring lifelong regret to the man who "did not think."

Carlessness will neutralize talent. The finest abilities developed in a mind may be rendered useless by a failure to think at the proper time. Legions of young people fail who might succeed if they would conquer their predisposition to carelessness.

Digitized by Google

The Statistician or Rate-Maker

His Duties in Employers' Liability and Workmen's Compensation Insurance

By A. C. Hendrick

A Lecture Before the American Society of Safety Engineers.

IT gives me pleasure to address you on a subject with which you are in daily contact—particular pleasure because the subject is a hobby of mine, viz.: An Insight Into the Duties Incumbent Upon a Statistician or Rate-Maker for Employers' Liability and Workmen's Compensation Insurance.

The work of a liability statistician and rate-maker is a sort of new institution made necessary by the various developments and enlargements of the compensation and employers' liability business. The various duties consist of arranging all technical and statistical matters in connection with classifying, underwriting, schedule rating and experience rating and preparing general statistical matters to place before the various rating boards in connection with compensation and employers' liability rates, keeping a check on the various rates issued to see that they are sufficient and satisfactory, that the ratio of what a company gives is not too much for what it receives, and that the discretionary or specific limits of rate discounts are kept within the proper bounds. The work embraces a combination of analysis, systematics, statistics and mathematics and the various engineering sciences.

The necessity for schedule rating had been a matter revolving in the minds and speech of underwriters and insurance engineers for years, and with the general advent of employers' liability and workmen's compensation insurance and a scientificially arranged scheme for classifying the various occupations and branches of human endeavor with definite and fixed rates for the various classifications, and with the success of fire insurance rating as a guide and incentive, a scheme was evolved that with the improvements and revisions made thereon since its inception is now, technically, about as well arranged as any piece of accurately regulated mechanism.

The life insurance actuary bases his premium calculations according to the law of average as expressed in the experience table of mortality. There is no such thing as a superstandard risk, but there are substandard risks, that, on account of occupation or on account of physical defect, must pay an additional or advanced premium to maintain the law of average as expressed in the mortality table.

On account of the insufficient and incomplete statistics at hand in connection with payments made in this country for workmen's compensation accidents, liability statisticians had a much harder task to fit the law of average to compensation rates. Survivorship tables had to be taken into consideration, as the various State laws call for payments that may run for a considerable number of years, with the ever present necessity for exercising care to get an adequate rate to cover the risk and not to be too liberal in discounting future promises on an inaccurate record of past performances. It was a matter of applying the ratio or equivalent of the number of working days lost on account of injuries, and the nature of the injuries, to the record of dollars and cents that had been paid out by companies for liability accidents in the past. The matter presented the same difficulty as confronts a handicapper when assigning weights and future promises on past performances with the horses running the reverse way and on a strange track.

After the various classifications and basic rates were established, the next thing in line was to draw up a schedule whereby a physical inspection of the

Digitized by Google

various hazards in the various separate industries could be adequately measured by a system of standards with the idea in mind to establish, hypothetically, an average plant and to establish a system for giving rate credits to a plant above this established average and fix rate charges on those below the established average. In making up this schedule about 100 items, covering everything from catastrophe to moral hazard, as found by inspecting thousands of risks, were taken into consideration and the items separated in such a way as to have a varied effect on rate credits and rate charges. By this system of schedule rating an employer with a poorly arranged shop and an ordinary disregard for safeguarding his employes, with no regard for their moral welfare and an absence of shop discipline, will be effected in such a manner as to produce an added premium commensurate with the added hazard in such a plant. On the opposite side, we have a well arranged establishment with every regard for the safety and welfare of the employe, morally as well as physically. Such an establishment would produce various credits for each and every hazard that has been eliminated and for the extra care of welfare supervision, and establish a rating that would be below the average or basic rate; and in that way maintain the law of average between these two risks.

The physical items embraced in the Analytic Schedule method of rating are divided into four classes according to the manner or method of their relationship to the risk as a whole. Catastrophe hazards embrace such items as buildings, foundations, tanks, floor overloading, boilers, stacks, steam engines, fire hazard and explosives. If a manufacturing establishment is favorably housed in modern buildings, with modern building equipment and other of the above items, modernized or standardized, so as to lessen or eliminate the possibility of catastrophe by fire, collapse or explosion, then a rating credit is given, or, if conditions are the reverse, a rating charge is imposed.

Another section separates machine operatives, machine-layout, maintenance and inspection and first aid equipment as having a direct bearing on the inherent hazard of the industry or classification; therefore credits or charges for these items are based on percentages, lessening or increasing the basic rate.

The third separation embraces such items as floor and wall openings, hoistways, stairs, elevated runways and power transmission equipment, to the hazards of which only a portion of the employes are subjected. The absence of these conditions does not warrant a credit, but their presence, if unguarded, warrants a charge which is fixed in such a way as to bring an exact and consistent premium return for each unguarded exposure.

Another division gives by the same method premium credits for fully guarded machines and also for machines that have dangerous points of operation so guarded as to lessen or eliminate injuries to operatives. All the above so-called physical items are arranged in such a manner as to reflect a limit of 20 per cent credit on the basic rate for the superstandard establishment or plant.

The so called moral hazard section embraces the charges and credits for such items as well spaced aisles, safety ladders, goggles, respirators, general orderliness, proper and sufficient sanitary conditions, good ventilation, sufficient artificial or natural lighting facilities and for safety and welfare organization and education conducted and encouraged by the employer for the benefit of the employes. These moral hazard items have a bearing only in so far as the employer feels morally obligated to consider the welfare of his employes, so, therefore, if the employer makes the above conditions safe, pleasant and sanitary and in that way, and by education, effects the raising of the moral status of his employes, it can be safely assumed that the standard of this establishment as regards moral hazard is the reverse of one where all the above conditions in regard to general order, light, ventila-

778774

Digitized by Google

tion and sanitation and safety education are utterly disregarded. The credits and charges for these items are fixed in direct ratio as to the regard or disregard of the above conditions, and the specifically enumerated items are arranged in such a manner as to give an additional limit of 20 per cent credit for the establishment that is morally well conducted, which, together with the 20 per cent credit allowable for the so called physical conditions, makes it possible for an employer with a superstandard establishment to secure compensation coverage at 60 per cent of the basic rate. This 60 per cent represents that part of the premium which an insurance carrier must collect to cover the inherent hazard due to the nature of the industry, and the 40 per cent discount represents that portion of the premium for extra or unnecessary physical hazards which have been safeguarded or eliminated in addition to the safety education, welfare propaganda and the general orderliness which the employer has felt morally obligated to supply.

As a part of the general rating system, accident experience was introduced as a method to assist in qualifying rates for manufacturing risks and as the only available method for establishing individual rates for contracting and various other risks where the operations are not manufacturing or are subject to constant or periodical changes of methods, location and employes, and are therefore not applicable to schedule rating.

The necessity for experience rating in conjunction with schedule rating arose on account of the fact that manufacturing risks which were found upon inspection to conform to the accepted average from a physical and moral rating standpoint and where everything in connection with the risks indicated normality, nevertheless produced abnormal accident records or showed considerable accident frequency above what would be the accepted average for the industry. These were cases which could only be explained as "that the accepted average by physical inspection was not properly balanced by the accepted average of accident experience"; therefore, the law of average as applying to such risks became partially or very decidedly unbalanced and forced them, like black sheep, before the particular notice of underwriters. Like nice and clean and freshly dressed children who are sent out to play clean games but come home with their hands, faces, legs, and clothes awfully soiled, these were inexplicable cases. Therefore, the necessity arose for combining experience rating with the schedule rating so as to offset the undue credits which some risks invariably earned by their physical perfection, and thereby to establish the proper balance and secure an adequate rating for all the features involved in the risk with a just premium tax for the insurer and the assured.

The methods for applying experience rating and the compensation experience valuations vary in the several States, but the theory is the same, the object being to have the experience fluctuations offset, increase or decrease the credits or charges applying to the physical and moral valuations of the risk as a whole. The idea is all right and should be universally adopted for every manufacuring risk as it adds to the practicability of drawing a line between a good and a bad risk and determines a more equitable premium adjustment than by the method of physical and moral rating only.

The system of experience rating is limited at present to risks having a total payroll exposure of $25,000 or more for from one year (in New York State two years) to five years; the accidents for the same period are grouped according to their nature into four general classes, temporary or permanent disability cases, dismemberments and fatal accidents. A theoretical value has been assigned to each type of accident, based upon past experience and the valuations contained in the provisions of the various States' compensation and liability laws, the loss cost hereby developed is compared with the existing manual rate applicable to the risk, and a credit or charge applied

Digitized by Google

depending upon the loss ratio as brought out by the above method and by the guidance of a chart having fixed payroll zones and containing the exact percentage of charge or credit to apply to the manual.

SOME OF THE REFINEMENTS OF THE SCHEDULE RATING SYSTEM

Metal Goods Manufacturing, N. O. C. and Braid Manufacturing.—The varying methods in connection with the manufacturing of metal goods, and the wide diversity of the several types of establishments usually classified as metal goods manufacturing (N. O. C.), same embracing plants where considerable stamping hazard existed to risks that conducted only small stamping operations, produced rating results that did not always express the true hazards involved for the various types of risks so classified. For one type of plant the basic rate was exorbitant, and for the opposite type of risk the basic rate was inadequate; and schedule rating alone did not bring the desired results of an adequate premium tax for the various types of risks. This condition necessitated inventing a method whereby the inherent features of the risk would be equitably measured to constitute a basic rate whereon to begin to apply the merit rate, so a formula was evolved by a system of deduction beginning at the rate for pure stamping and fixing a constant which is modified by the percentage of machine operatives and the percentage of hand-fed punch and stamping presses plus the rate for machine shop operations. The result is that where a shop conducts one quarter the operations usually assigned to a pure stamping risk only one quarter of the stamping rate will result. Proportionally all these risks are thereby measured to the pure stamping hazard and the resultant rates are ratios of the amounts of hazards involved.

The difficulties involved in securing an equitable rating by schedule methods for braid manufacturing risks were mostly presented in the excessive transmission charges resulting from unguarded shafting, gears and set screws in connection with the automatic machines used in this industry. The charges for the unguarded transmission features invariably resulted in taxing the average plant with a rate far in excess of the hazards involved and necessitated the establishment of a method whereby the hazards in connection with the power transmission of the braid manufacturing industry would be equitably measured so as to produce an adequate rate and premium tax for each individual risk. Under the regular schedule method, exposed gears were charged $1 for each unguarded meshing point, $1 for each exposed set screw and $2.50 for each 100 feet of exposed low running transmission shafting. On account of the nature of this industry, necessitating frequent adjusting and shifting of gears and machines, it was not always feasible to guard the transmission exposures, and when one considers that for economical reasons machines are arranged in rows back to back and the driving mechanism so arranged that each set of gears has four meshing points together with the great number of set screws necessary to fasten the gears to the shafting, the charges on some risks were enormous, in some cases over 1,000 per cent of the basic rate. Among experienced schedule rate makers it was the unanimous opinion that there was "something wrong" if a braiding risk did not produce several hundred per cent increase in rate, and a risk producing a low percentage of increase, say only 100 or 200 per cent, was looked upon with suspicion, the rater believing himself either to be in error or that somebody was trying to "put something over" on him.

The above conditions necessitated a re-arrangement of the conditions for merit rating the braid manufacturing risks, and a formula was evolved whereby the basic rate is modified by the ratio of the number of braiding machines driven by exposed gears to four times the total number of braiding machines in the establishment (four times, to represent the number of meshing points on gears). The resultant rate expresses an adequate tax,

Digitized by Google

sufficient to cover the risk, and in a simple way a great difficulty was overcome (the difficulty of an explanation from the insurer to the assured of "why the rate was so excessive").

COMPENSATION INSURANCE, COMPENSATING SERVICE—THE SAFETY ENGINEERS' OPPORTUNITY

Recently I figured over an array of interesting statistics showing that the Compensation Inspection Rating Board of New York during the year 1915 rated a total of 27,897 compensation risks having a total estimated payroll exposure of $713,427,793 with a total manual premium thereon of $10,927,-319.18 at an average saving of 15.5 per cent or $1,688,457.20 by agency service.

Referring to the subject matter and in plain figures, this means that the average manual premium for compensation risks which were subject to rating was cut by inspection service from $391.70 to $330.99, same representing an average saving of $60.71 or 15.5 per cent on the average individual risk. The average manual rate for $100 of compensation payroll was $1.53 and the average actual rate paid was $1.29 per $100 of payroll. Here, service saved 24 cents on every $100 of average payroll premium or 15.5 per cent.

This is compensating service; compensating because there should be satisfaction expressed on both sides of the equation, or better expressed, 84.5 per cent of average premium paid by the assured was balanced on the compensating scale by 100 per cent of company, agency, and safety engineering service.

All the above figures also disclose the interesting fact that the risks subjected to the single or combined methods of physical, moral and experience rating were only 38.7 per cent perfect, with opportunities for 61.3 per cent of improvements. This is the agent's and safety engineer's opportunity and as time goes on, and conditions are bettered by enlightenment and safety education, we can reasonably expect the average percentage of credit to increase and the ratio of loss experience to decrease, with lower average rates.

Scientific rating as in vogue at present does not fit all cases but, from a statistical standpoint, it is like ivory soap, 99.44 per cent perfect. The few isolated cases on which rating does not bring out the true physical conditions are more than overbalanced by the variety of cases where the physical rating produces every cent of credit due a policyholder.

Horsemen and horsebreeders have striven for years to attain perfection in the thoroughbred horse by breeding, training, racing and feeding. What the ultimate 100 per cent perfect racehorse will be like nobody knows, and how near the present-day thoroughbred is to the ultimate attainment, nobody knows; but, nevertheless, in this industry, education, science and engineering have accomplished wonderful results. One need only to compare the fractional times of various distances run by such cracks as Lamplighter, Longfellow and Domino with Jack Atkin, Roamer, Roseben and Iron Mask to realize the superiority of the modern horse over the old timer, and the superiority of the modern track engineering as against old time methods. In scientific rate making, conditions are different. We have standards already attained and proven out. Therefore, the safety engineer knows what a 100 per cent perfect plant is like by standard comparisons and what the upkeep and replacement should be to continue in the perfect state.

Our object should be to educate and enlighten the employer and the employe, be strict about the enforcement of safety standards, explain to the assured the benefits accruing from "Safetyfying and standardizing" his equipment and methods. Not only will he be benefited by resultant rate credits but he has the satisfaction of seeing the efficiency of his working force go up, production increase and his compensation insurance rate decrease within limits reasonably sufficient to cover the inherent hazard of his industry.

The above gives you, gentlemen, an idea as to what the methods were and are, and what they have accomplished.

Digitized by Google

and following are some further refinements and improvements that we expect to have come, because the science of insurance engineering like safety engineering has been moving forward for better results, and we are trying to adjust that other 56/100 of one per cent lacking on perfection of the system heretofore.

Insurance engineers, soon after the advent of workmen's compensation, found that there were two ways of doing a profitable business under the rating rules and, as in baseball, a knowledge of the rules sometimes helps to win the game. One way is to credit favorable or good risks and charge the unfavorable or bad risks, both according to their merits; this method would appear to be the true method as intended and should maintain the law of average. The other method is to credit favorable or good risks and throw the bad risks overboard. This improved some of the bad risks and the safety engineers have brought some of them back to the right side of the credit alignment, and this latter method seems to be justified because, seemingly, those that persisted in being shoved around have not profited by the experience and would not listen to "safetyfying," and they are very obviously the risks that have helped to increase the classification rates for their industries, as recently enacted in the new rate manual. But then this latter method is not the ideal method; rating rules should be established so that any underwriter of any company would be prepared to underwrite any risk depending on the engineering department to improve it by service or, if it will not be improved, then to hold it and enforce by law an adequate rate for liability assumed. Here is where one of the faults of the present method for applying or withholding favorable or unfavorable experience is to blame, and the insurance engineer has had to figure which was the best method to prevent jeopardizing his company's interests. Compensation insurance was made compulsory by law. Experience rating of all compensation risks should be made compulsory so as to guarantee the future soundness of the basic principles underlying insurance, and as a matter of justice for future insurers and future beneficiaries of the law, so as to guarantee to them the perpetuation of compensation and its payments.

The workmen's compensation law embraces the greatest short story ever written but it was the work of the insurance engineer and the safety engineer that made the story readable and applicable. A great many sermons could still be written around this subject and soon there will be an addendum written as another section of the story. This sequel will expound the great benefit of combination and compulsory coverage of workmen's compensation—sickness disability, idleness, old age pensions and natural death benefits. And when this sequel is written then you, gentlemen, will be not only safety engineers but liability and accident inspectors, health and disability inspectors, idleness inspectors; old age, pension and death claim adjusters. So, gentlemen, study and be prepared for the great future of industrial and economic progress.

Report Each Injury

AN employe of the Corn Products Refining Company reported with an infected hand, which was due to an injury that happened three or four days before, and was not reported at once. He had to be sent to the hospital for sixteen days, and he nearly lost his hand. He lost $56 in wages. Most of the time and money loss could have been avoided if he had reported his injury at once.

Digitized by Google

The Bureau of Fire Prevention in the City of New York

Report by Joseph O. Hammitt

Chief of the Bureau of Fire Prevention.

A SUBSTANTIAL reduction in the number of fires was accomplished in 1915. The number of fires was reduced from 14,425 in 1914 to 13,416 in 1915. The average loss per fire, according to the statistics compiled by the Bureau of Fire Investigation, was reduced from $569.50 to $428.92 and the per capita loss by fire in the city was reduced from $1.44 to $1.06.

The Bureau of Fire Prevention served by personal service or by mail 14,823 orders in 1915. During the year 12,262 orders were complied with and 2,962 rescinded. Of the orders issued, 2,185 are for the installation and maintenance of fire drills, and are, therefore, of a continuing nature, and cannot be fully complied with except by the continual maintenance of the drill until the occupancy of the building is radically changed. These are not included in the statement of orders complied with, although they are included in the statement of orders issued. The orders complied with contain 24,834 items. During the year the bureau made 159,503 inspections, including all kinds, some of which involved but brief visits to buildings, while others required several days of work in the careful examination of a single premises.

The purpose of this statement is to give some idea of the quantity and character of work performed by the Bureau of Fire Prevention; and also to describe the steps taken to overcome the handicaps under which the bureau has been laboring because of the inadequacy of its force, the confusion that grew up in 1912 and 1913, when, without a satisfactory organization, it was called upon to perform duties suddenly transferred to the Fire Department from other bureaus, and the fact that the job of making buildings safe against fire is too big to be accomplished in a few years.

DISPOSING OF UNCOMPLIED-WITH-ORDERS

The Bureau of Fire Prevention was created in the year 1912. By January 1, 1914, it had accumulated 12,494 orders not complied with. The task of disposing of these uncomplied-with-orders has continued until the present time to be a serious problem. In attacking this problem the department was handicapped by the necessity of catching up with other work which was quite as far behind as the work of disposing of pending orders. For example, on January 1, 1914, there were, besides these uncomplied-with-orders, something over 13,000 pending complaints upon which inspections had to be made for the issuance of the necessary orders. These complaints were accumulating at the rate of from 500 to 600 per month more than the total that could be inspected with the available force, under the system of handling the inspection work which was at that time in operation. Meanwhile, the examination of the reports of inspectors to determine what orders should be issued, was at least three months behind, and the actual typing of orders upon reports already examined was approximately five months behind. The burden of this pending work has continually retarded the efforts of the bureau to correct newly discovered fire hazards.

By the end of the first quarter of 1915 the bureau was substantially abreast of the work of inspection upon complaints and upon the reports of company commanders, but the number of orders not complied with had increased from 12,494 on January 1, 1914, to 16,691 on January 1, 1915. In the year 1915 the number of pending orders was reduced from 16,691 on January 1 to 16,455 on December 31.

Actual reduction in the number of orders pending has been much greater than

Digitized by Google

indicated by the above figures. During the years 1914 and 1915 upward of 7,000 orders were issued for the installation and maintenance of fire drills. These orders, being continuing in their nature, must be kept on the records as pending even after the fire drills have been installed. Deducting these 7,000, it appears that the number of pending orders other than those which must be continually kept on the records as pending, was reduced from something less than 12,500 on January 1, 1914, to approximately 9,500 on December 31, 1915.

In order that the magnitude of the work of disposing of these pending orders may be appreciated, it is necessary to correct a prevalent misconception that the greatest amount of fire prevention inspection work is the discovering of violations and issuing orders for their correction. On the contrary, it takes many times more inspection work to enforce an order than to discover a violation.

ENFORCEMENT THE LARGEST INSPECTION PROBLEM

The work of the Bureau of Fire Prevention in securing the correction of a dangerous condition is barely commenced when the orders for its correction are issued and served. The time and cost of serving criminal processes (which is all done by inspectors, no assistance in this work being furnished by the process servers in the city's employ) and of preparing affidavits (also done by the inspectors) and of making reinspections in order that the evidence may be available for the courts, appearing in court as witnesses, holding necessary conferences with owners and tenants to consider alternatives offered to meet the requirements of safety at less expense or less inconvenience, explaining to such owners and tenants and their attorneys, architects and contractors the reasons for the orders, passing upon plans and pointing out to contractors defects found in work done, and reinspecting to verify reports that violations have been removed, with all the incidental correspondence and clerical work, is many times greater than the time and cost of discovering the violations and prescribing the methods for removing them.

In fact, if it were necessary to go into court for the purpose of enforcing every order issued, very few orders could be enforced. This explains the necessity of discouraging such delay in compliance as necessitates the taking of cases into court, by asking the court to impose penalties and, in extreme cases, to vacate the property.

In order that the important work of enforcement might receive more attention and that the trained inspectors of the Bureau of Fire Prevention might have their energies concentrated upon certain classes of work that had been neglected because of their difficult and time-consuming character, and further to extend the work of fire prevention by the use of all the resources of the department, the activities of the uniformed force in this kind of work are being extended.

UNIFORMED FIREMEN IN PREVENTION WORK

Prevention work performed by the uniformed fire fighting force was inaugurated at the beginning of the year 1914 and has been gradually increased and developed. In December, 1915, a policy was adopted of referring nearly all complaints of dangerous conditions in the first instance to the company commanders, thus eliminating the necessity of original inspections in such cases by the Bureau of Fire Prevention, except when important structural changes are recommended or the conditions reported are of a complicated character requiring further examination before orders can be issued upon the company commanders' reports. In addition to inspections upon complaints, each company commander is called upon to cover the conditions in the buildings in his district approximately once each month. His reports are forwarded upon forms specially prepared for the purpose. Housekeeping conditions, which in previous years occasioned the issuance of thousands of fire prevention orders, are now corrected in a great majority of cases by verbal notices of the members of the uniformed force.

It is easy to see how this relieves the problem of disposing of uncomplied-with-orders. If the firemen were not correct-

Digitized by Google

ing bad housekeeping conditions by verbal notices, it would be necessary to cover these conditions by formal orders requiring service and a considerable amount of inspection work to enforce. The aim is to reduce to a minimum the number of formal orders necessary to be served each year, so that sufficient pressure may be placed upon the work of enforcement.

The number of fire prevention orders issued during 1915 was 10,830 less than the number issued in 1914, this difference being entirely accounted for by the correction of housekeeping hazards through the inspections and verbal notices of the members of the uniformed force. This has made it possible to use the inspection force of the Bureau of Fire Prevention mainly for the correction of conditions requiring important structural changes and of those conditions of bad housekeeping that it has been found impossible to correct through verbal notices.

ATTENTION DIRECTED TO MOST HAZARDOUS BUILDINGS

Furthermore, the reports of company commanders serve to give the department information as to what buildings present the most serious dangers to life and property. The attention of the Bureau of Fire Prevention is given first to these buildings.

Thus the work of the Bureau of Fire Prevention is supplemented by fire prevention work of the uniformed force, and to a large extent the activities of the Bureau of Fire Prevention are directed where most needed by the reports of the company commanders. This system of co-operation between the two branches of the department has been a gradual development during 1914 and 1915, and will be still further developed in the future.

The fire prevention inspections of the uniformed force can be still further systematized and extended in their scope and the work of the Bureau of Fire Prevention concentrated to a greater and greater extent upon the class of cases requiring technical and special training that is not a necessary part of the education of the average fireman. The experience and judgment of the officers of the uniformed force in dealing with fire hazards are being by this system availed of to a greater and greater extent in working out fire prevention problems.

Before any formal orders are issued they are subjected to scrutiny by the examiners of the Bureau of Fire Prevention. A plan will be devised by which the company commander can be informed of the action taken upon his reports so as to eliminate the necessity of his repeatedly reporting a condition not complying strictly with the regulations that has nevertheless been considered and accepted as reasonably safe.

The Bureau of Extinguishment reports having made 1,500,000 inspections during the year 1915 and having corrected 50,000 conditions by verbal notices.

The reports received from the Bureau of Fire Extinguishment were immediately delivered to the examiners who, if the matters reported were within the Fire Commissioner's jurisdiction to correct, disposed of them by the issuance of the necessary orders or referred them to inspectors of fire prevention for more complete inspection reports where necessary. Reports of company commanders showing conditions under the jurisdiction of other departments were referred to the proper authorities.

EFFECTIVE CO-OPERATION OF POLICE

The city police are co-operating in an effective manner in the enforcement of those provisions of Chapter 10 of the Code of Ordinances which make it unlawful to conduct certain classes of business without permits from the Fire Commissioner. The Police Commissioner called these ordinances to the attention of the force and pointed out in general orders the duty of the police to serve summonses for all violations of city ordinances. A plan for co-operation between the two departments was worked out, and particularly during the last three months of 1915 it proved effective in the enforcement of fire prevention orders affecting occupancies requiring permits. These occupancies, if not properly protected, constitute the greatest fire hazards in the city. Permits are not issued by the Fire Commissioner in cases where fire prevention orders are not complied

Digitized by Google

with. Police action against persons unlawfully conducting hazardous businesses without permits therefor results in their complying with fire prevention orders in order to obtain such permits.

AMOUNT AND CHARACTER OF WORK

The amount and character of work performed by the Bureau of Fire Prevention during 1915 is to a degree set forth in other sections of this report dealing with special branches of the fire prevention problem and the activities of several divisions.

In addition to the total of 159,503 inspections made by the field force during the year, including many that involved the examination of all the features of fire protection in very large risks, the bureau examined and passed upon 1,956 plans, made laboratory tests of materials and devices submitted for approval, and prepared hundreds of special reports dealing with questions of fire prevention and protection and involving original investigations.

FIRE PREVENTION REGULATIONS PUBLISHED

The policy of publishing the regulations of the Bureau of Fire Prevention in the *City Record* was inaugurated in 1915, and these regulations are now published from time to time for the information of building owners, architects, contractors and others interested.

The regulations on the following subjects have been codified and printed in pamphlet form for distribution:

Explosives and Ammunition,
Portable Motion Picture Booths,
Electrical Equipment for Sprinkler Systems,
Exit Facilities for Buildings,
Standpipe (Fire Line) Equipment,
Inflammable Motion Picture Films,
Refrigerating Plants,
Fireworks and Matches,
Technical Establishments, Drug Stores, etc.,
Garages,
Dry Cleaning and Dry Dyeing,
Motor Vehicle Repair Shops,
Mineral Oils,
Inflammable Mixtures,
Combustible Mixtures,
Paints, Varnishes and Lacquers.

The entire body of regulations relating to explosives, combustibles and hazardous trades was codified and embodied in Chapters 10 and 12 of the Code of Ordinances adopted by the Board of Aldermen.

AUTOMATIC SPRINKLER PROTECTION

The most important class of fire prevention orders dealt with were the orders for installation of automatic sprinkler systems. More sprinkler systems were installed in this city in 1915 than in any previous year. Probably not more than 35 per cent. of the sprinkler work was done under direct compulsion of orders from the Fire Commissioner, although a number of installations that were not ordered by the Fire Commissioner were provided to make possible the use of buildings for hazardous occupancies under the regulations of the Fire Department. Seventy-nine sprinkler systems were installed by order of the Fire Commissioner. All but a few of these were installed in factory buildings where large numbers of workers are employed. This is the best form of protection at present provided for factory workers. No life has ever been lost from fire in a sprinklered building in New York City.

INTERIOR FIRE ALARMS

Two hundred and seventy-three factory buildings were equipped with standard interior fire alarm systems by order of the Fire Commissioner in 1915. These interior alarm systems are required by Section 83A of the State Labor Law. They are electrical systems. Each system is carefully examined and tested by the Bureau of Fire Prevention before it is approved. At the end of the year these systems were being approved on test at the rate of about four a day. Forty-eight interior fire alarms were installed in hotels, lodging houses and other non-factory occupancies by order of the Fire Commissioner.

REGULATIONS OF HAZARDOUS TRADES

The Division of Cumbustibles issued 24,159 permits in 1915 for occupancies of a character deemed hazardous and there-

Digitized by Google

fore subjected to this form of regulation by the provisions of Chapters 10 and 12 of the Code of Ordinances. The number of permits issued compares with 18,224 issued in 1914, an increase of 5,935. The amount of fees collected in 1915 was $155,411, as compared with $141,445 in 1914, an increase of $13,966.

MOTION PICTURE FILM HAZARDS

Of all the hazardous trades regulated by the Division of Combustibles, the storage and handling of motion picture films is the most difficult to safeguard. Our experience with this industry in 1915 indicates the vital importance of continued attention to it by the Division of Combustibles. Celluloid film is of an explosive nature under certain conditions and constitutes one of the most serious fire hazards in the city. There is comparatively little danger from this film in the motion picture theatres where the amount on hand probably never exceeds from 40 to 60 pounds, and adequate safeguards can be provided. A great danger exists, however, in the exchanges where a ton of film may be stored in a single vault.

There are several instances of from 25 to 35 tons of film stored in a single building. Such storage is permitted only in fireproof buildings equipped with automatic sprinklers, and regulations are established regarding the methods of storage.

Films are examined and repaired in the exchanges, and accumulations of scrap are found in the examining rooms. The examining room always presents a hazard, especially if housekeeping conditions are not good.

Another branch of the film industry is the taking and developing of negatives and printing on the celluloid film. The studios where the pictures are taken have stocks of scenery and properties that furnish excellent fuel for a flash fire. Frequently the developing and printing plants are located in the same building and these present serious special hazards.

Considerable friction has been occasioned in the enforcement of regulations governing the storage and handling of motion picture films by the fact that these regulations have undergone changes from time to time. Successive experiments have demonstrated the need of these changes, and the Fire Department has always based its regulations upon what was known at the time regarding the hazards. Of these hazards a great many of the persons engaged in the industry displayed such ignorance and disregard that it was necessary to conduct a campaign of education.

The regulations provide that each reel of film when not in actual use shall be kept in a separate metal container with tight-fitting cover. Compliance with this regulation involves no considerable expense, while as a safety measure it is of the utmost importance. Yet hundreds of five-pound reels not in metal containers could be found in the exchanges in the early part of 1915. After repeated warnings it was necessary for the Division of Combustibles to close up several of the exchanges to obtain compliance with this simple requirement of safety.

MORE STRINGENT DYNAMITE REGULATION

The large amount of dynamite stored on the street surface in connection with subway construction, and the efforts, successful in some cases, to obtain dynamite from licensed magazines for criminal purposes, led to a more rigid control over the storage and handling of dynamite. The inspection of magazines was extended throughout the 24 hours, and about 40 blasting permits and 40 certificates of fitness for handling dynamite were revoked during the last six months because of violations of the city ordinances.

By considering an accident in the use of dynamite as presumptive evidence of negligence, and holding the users thereof strictly responsible for results, those handling dynamite have been strongly impressed with their personal responsibility for safe-guarding workmen and the public.

The total amount of dynamite used during the year 1915 in Greater New York was 1,147,682 pounds, an average of about 3,800 pounds per day.

EXTENT OF COMBUSTIBLES REGULATION

The types of occupancy and activities on which the Division of Combustibles have made inspections for the issuance

Digitized by Google

of permits during 1915 include the following 23 classes:

Manufacture, storage, sale, transportation and use of explosives.

Storage of ammunition.

Manufacture, storage and use of fireworks.

Storage of matches.

Storage and refining of mineral oils.

Manufacture and sale of inflammable mixtures.

Manufacture and sale of combustible fibers.

Garages and motor vehicle repair shops.

Dry cleaning and dry dyeing establishments.

Manufacture, storage and sale of paints, varnishes and lacquers.

Storage and sale of calcium carbide.

Gases under pressure.

Refrigerating plants.

Use of nitro-cellulose in manufacturing.

Storage and development of inflammable motion picture film, and the taking of motion pictures in studios.

Storage and distilling of liquors and alcohols.

Storage of oils and fats.

Technical establishments.

Wholesale drug stores and chemical supply houses.

Retail drug stores.

Storage of packing boxes.

Storage of combustible fibres, including rags and waste paper.

Sale of kerosene.

Proper Protection From Molten Metal

By F. W. King

THERE are many conditions of industrial work where the protection afforded by goggles is not sufficient. For instance, men engaged in pouring babbitt, pouring lead joints on cast iron pipe, iron and cindermen employed at factory cupolas and blast furnaces and other occupations where there is danger from any source of a metal splash need protection for the face, head and neck, as well as for the eyes.

Although goggles will save the eyes from injuries from these splashes, the face, head and neck are sometimes severely burned, necessitating the victim's being laid off for weeks before he can resume work. Such preventable accidents tend to make the other workmen engaged in this work timid and consequently less efficient.

A new form of babbitting mask which affords protection against metal splash has been designed to cover these hazards. This protection is needed by all men subjected to the metal splash hazard. One subsidiary of the U. S. Steel Corporation has 65 babbitting masks in use in one plant, indicating the importance this

company attaches to properly safeguarding its men against metal splash.

The argument has been advanced

Digitized by Google

that splashes of metal are inexcusable and are of rare occurrence. It is true that metal splash is sometimes unpreventable. The whole aim of accident prevention is to safeguard workmen against every danger as far as possible, both preventable and unpreventable.

Numerous instances exist where men's eyes have been saved by proper protection against metal splash and, unfortunately, many instances have occurred where men have lost their eyes through metal splash, because they were not protected. This new babbitting mask is also useful as a protection against heat in laying bricks in an open hearth furnace and in many other occupations which call for face and head protection.

In design the new mask embodies features different from those of previous types. Formerly a protective glass of curved form was placed behind the wire cloth or screen. This was necessary, as splashes of hot metal penetrate the screen. The wire cloth reduced by 30 per cent the light and illumination reaching the wearer. This rendered the mask inefficient in dark parts of the plant. Eye strain was apparent for this reason. The new mask is made with the screen cut out before the eyes and a special strength of lenses is substituted which results in obtaining full and uninterrupted vision with no discomforts.

By blacking the wire cloth easier and better side vision is obtained. The mask is made as light as possible and its weight is supported by a cap adjustable to any size of head.

In designing the new mask the manufacturers considered many valuable suggestions received from some of the leading industrial safety men who had preliminary samples sent them. These were given service tests by workmen. This latest babbitting mask is therefore not an experiment but has been produced in accordance with actual service requirements.

Improved Safety Code for Foundries

THE formulating of a code of accident prevention and health preservation for foundries was completed last month (July), by the committee on Safety and Sanitation of the American Foundrymen's Association. The committee represents 829 foundries in the United States, Canada, England, France, Mexico, Japan and Korea. Victor T. Nooman, safety director of the Industrial Commission of Ohio, is chairman.

Under the new code the foundry must provide inside lavatories for its workers, drying rooms where the men must put their working clothes when they are removed after the day's work, shower baths and lockers in which the men may put their street clothes. The code provides that the hundreds of women working in foundries as coremakers shall have similar conveniences.

All foundry employes must report injuries promptly, especially small cuts and bruises. The use of liquor by employes shall be prohibited during working hours and discouraged at all times. It is provided that no woman shall lift a weight of more than 15 pounds. There is also a provision that no woman may handle a plate or piece of metal of a higher temperature than 110 degrees. The code specifies numerous shower baths for the employes.

Employes are forbidden to use toothpicks, matches and handkerchiefs in removing particles from the eyes of fellow workers. All eye injuries must be treated by a physician. Emery wheels must be hooded and provided with safety collars. Trap doors should be guarded and all stairways and passages lighted. The use of high explosives for the breaking of castings is prohibited.

Foremen are called upon to take a personal interest in accident prevention. Employers are urged to use educational methods in their plants.

The report of the committee is to be submitted to the International Convention of the American Foundrymen's Association to be held in Cleveland on September 11.

Digitized by Google

Safety Work in Gas and Electrical Industries

Special Problems of Public Service Companies to Protect Their Employes and the Public

Saved His Life by Hammering the Soles of His Feet

WRITING to the National Electric Light Association Bulletin on the value of inflicting pain by a blow in resuscitation after electrical shock, W. P. Strickland, general inspector of the New York & Queens Electric Light & Power Company, says:

"Recently one of our foremen after climbing a pole, preparatory to stringing primary wires, received a shock that caused him to fall to the ground. It is inferred that in adjusting his belt and shifting his position his spur cut out, and that to save himself he instinctively reached out and touched the wires carrying 2,300 volts. When the other linemen and ground hands reached him, to all appearances the man was dead. One of the linemen, following instructions, immediately took hold of the ankles of the limp body, lifting it until the whole weight rested on the neck and then letting it fall. He then took a pair of connectors and hammered the soles of the injured man's feet without removing his shoes. Another lineman opened the man's mouth, pulled forward the swallowed tongue (which occurs in electric shock) and was about to begin the Schaefer prone method of resuscitation when the man returned to life. He was removed to the hospital and is alive and well today, though suffering severely from his burns.

"For the past year the writer has been teaching his men to strike the feet without removing the shoes in all cases of electric shock. Some years ago an accident occurred where a man came in contact with 6,600 volts, fell from the pole and was restored to consciousness by this means, although he was terribly burned and died three days later. Another accident that came to the writer's attention happened in New Jersey when a man came in contact with a wire carrying 2,200 volts. This man was struck violently on the feet, his tongue pulled out, and he was restored to consciousness before the arrival of the doctor."

Accidents Caused by "Man Failure"

JULIAN LOEBENSTEIN, in a letter to the *Electrical World,* attributes many accidents to man failure.

"One accident known to the writer" he says, "although not due exactly to the heedlessness of the man who was hurt, would have been less disastrous had he made certain that his instructions to deenergize a feeder had been complied with. Conditions leading up to the accident were as follows: A substation operator, desiring to change over the plug connections on a 6,000-volt arc-circuit board, had given orders to his machine tender to short-circuit the Brush arc machine. The machine tender, who was a new man on the job, was afraid of handling the switch, so instead of firmly closing the switch, he snapped it shut with the result that it bounced open again. The operator, in the meantime, having seen the tender go to the machine, took it for granted that it had been short-circuited, and pulled the plugs of the 6,000-volt circuit which was still alive.

Digitized by Google

A tremendous arc ensued which severely burned the operator about his hands and face.

"In another case a rotary-converter tender was burned by opening the wrong switch. The operator of the station had 'cleared' the transformers of a rotary converter from the alternating-current bus and had disconnected the machine from the direct-current bus, and the machine was slowing down. Under the instructions of the operator, the rotary tender had shut off the air blast to the transformers and was to open the low-tension switch between the transformers and the machine. After turning off the air blast, he left the transformer for a minute or so, for some reason or other, and then returned to open the low-tension starting switch between the transformers and the converter. Instead of going to the starting switch of the rotary which had been removed from the line, he opened the switch of the next machine which was carrying a load of about 1,000 kw. Naturally, a powerful arc occurred which burned him severely. Evidently the man must have been thinking of something entirely foreign to what he was doing at the time. This is an example of carelessness which is not especially confined to new men.

"In another case, failure of an employe to do the thing he started out to do caused his death. The accident occurred in a large generating station where trouble was experienced with a belt conveyor used for handling coal in the bunkers. Since it was against the rules of the company for a man to go into the bunkers alone, two men went up to investigate the cause. On locating it in one of the gear bearings, one man operated a switch automatically opening the oil switch which controls the motor circuit. There being no no-voltage releases on the auto-starters of the motors, he then went around and presumably opened the knife switch for each motor. Actually, however, he opened all of the knife switches except the one controlling the motor on which he intended to work. Not knowing this, he telephoned to have the oil switch closed, and then evidently seated himself on the gear preparatory to repairing the bearings. While so seated the oil switch was closed and as the knife switch on that particular motor had not been opened, the motor started, catching the employe in the gears and grinding him to death. While this is a rather uncommon accident due to carelessness it is typical of conditions that must be dealt with."

Accidents That Could Have Been Prevented

By J. L. Douglas, United Gas Improvement Company

BACK WHEEL of motor van went to pieces. Employe was thrown against a tree and sustained a possible fracture of hip. This accident would not have happened, if this van had been properly inspected.

An employe failed to use goggles provided for him, while cutting a 42-inch gas main. What was the result? A piece of steel entered his eye and the sight was destroyed. A very serious accident caused by carelessness. The use of goggles was all that was necessary.

A meter reader stepped on a can while going down dark stairs in a consumer's house; was thrown to the bottom and sustained severe bruises. Flash-lights should be used in dark places. Consumers cannot be depended on to keep obstacles off stairways.

An employe failed to put on trouser guards before riding bicycle. His trousers caught on the chain; he was thrown and an injured arm was the result. A half minute spent in adjusting the guards would have prevented the accident.

An employe wore a pair of shoes with badly worn heels, which caused him to slip and fall while going down a flight of stairs. He suffered severe bruises of the leg. Defective shoes may easily be a prolific source of accidents, and care should be exercised to keep shoes in good condition.

Digitized by Google

Hand Rail and Screen Protection

SAFETY ENGINEERING is indebted to the courtesy of the Safety Organization of the New York Edison Company (J. L. Murrie, safety engineer) for the above photograph of standard hand rail and screen protection on rotary converters. The rails are insulated by wrapping with marline and painting with shellac.

Digitized by Google

Let Us Learn Self Preservation From Prehistoric Man

THE movement now on foot throughout the country to prevent accidents to life and limb is an acknowledgment by the public that the habits of carelessness and indifference to danger, that cost so many thousands of lives every year, must cease. There is nothing new in the practice of caution. It is probably the oldest custom known to man. In his prehistoric existence, man found himself in a defenseless position, surrounded by dangers which meant certain death if encountered. The huge animals which inhabited the earth at that time were so far superior to man in strength and ferocity that only by the strictest observance of "Safety First" was the existence of man made possible. Chance-taking and indifference to danger were practices that man soon learned were fatal. So he followed habits of caution. He sought safety in the caves and trees.

Truly, self preservation was man's first law. And it seems a strange fact that, from a strict observance of carefulness and avoidance of danger in the early ages, man should have come, in later days, to regard his own welfare lightly and treat with indifference the hazards which confront him. As a result of civilization and progress one would rather expect to find an opposite condition. In the lower animals caution and avoidance of danger is an instinct. With man the case is entirely different. The fact that 50,000 lives are sacrificed yearly in our industries, at least 70 per cent of which are preventable, proves a disregard by man for his own welfare and that of his fellows. An awakening has come. We see now that the only way to prevent the wanton sacrifice of human life and limb is by the practicing of habits of caution and carefulness.

Unfortunately civilization has tended to hold almost in contempt situations of danger. The habit of chance-taking has become more popular than the habit of caution, with the result that we must pay in sacrifice of life and limb the price that chance-taking demands.

The necessity is as urgent today for man to be careful, for him not to expose himself to danger, as it was in the early days.

Electric shock, liquid metals, power presses, huge gearing, blinding rays, deadly fumes, flying chips, metal and sand dust are menaces to human life as deadly as the cave-bear, the mammoth, the lion or the tiger. Contact with the modern life destroyers is as certain to result in serious injury or death as facing unprotected the dangers of old.

Man is beset today with far more dangers than ever before. The activities of daily life are such that a disregard of caution and carefulness is liable at any time to cause grave harm to ourselves and others.

The careless engineer in charge of boilers may easily cause his own death as well as death and injuries to scores of others. The careless signal man is liable to wreck a train and cause a great loss of life and limb. The man in charge of a large passenger steamship must exercise at all times the greatest care or he may cause a grave disaster.

The industrial worker is surrounded with conditions which call for the exercise of carefulness and caution. It is the duty of the employer to provide as safe working conditions as possible for his employes. No excuse can justify the existence of a needless hazard to the worker. It is the duty of the employe to be careful and to remember that carelessness creates a danger both to himself and his fellow workers. He should remember that his existence today depends upon the old truth, "Self preservation is the first law of nature."

Prehistoric man was the most ardent "Safety First" enthusiast and he practiced "Safety First" on all occasions. At the approach of danger he immediately withdrew to the safety afforded by his cave or a tall tree. Thus the practice of

Digitized by Google

safeguarding life against injury or destruction is about the oldest practice of man. While this great duty has been very much neglected in recent times the awakening has come at last. Protecting life has had a new birth. The renaissance of safety is at hand.

The full development of systematic industrial accident prevention will be the means of saving tens of thousands of lives every year which would be sacrificed otherwise on the altar of carelessness and indifference to the hazards of industrial operations.

The Decalogue of "Safety First"

T. J. MacMahon, American Car and Foundry Co. Bureau of Safety

I.—"SAFETY FIRST" is thy Guardian Angel. THOU shalt have no other WATCHWORD before me.

II.—THOU shalt not take chances, BUT thou shalt take CARE, use CAUTION, and exercise PRE-caution.

III.—THOU shalt see that "ALL IS CLEAN FOR SAFETY" each morning in thy person, thy clothes, thy tools, thy machine, thy surroundings.

IV.—THOU shalt wear thy goggles at thy work at all times. "Glass is made to see through, but thou CANS'T NOT see through a glass eye."

V.—THOU shalt not use a dirty handkerchief or cloth with which to remove particles from thy brother's eye. Lead him at once to the doctor. THAT IS HIS JOB—"EVERY MAN TO HIS OWN JOB."

VI.—THOU shalt have eyes in the back of thy head so that THOU mayest see behind thee as well as before thee.—Danger lurks in every step backwards.

VII.—THOU shalt take no Intoxicating Drinks—nor other RISKS—that thy days may be long in this plant.

VIII.—THOU art thy brother's keeper, so thou shalt guard his safety and interest as thine own.

IX.—THOU shalt not remove any Guard. It is the Acme of safety.

X.—THOU shalt remember that remorse and regrets cannot REMEMBER thy MAIMED body.

N.B.—THESE "Safety First" commandments cannot KEEP themselves—they must be KEPT; but they will PAY FOR THEIR KEEP by keeping their KEEPER in safety.

Useful Fire Prevention Booklet

"HOW to Assist in Reducing the Tremendous Fire Waste," prepared by Charles E. Worthington of the engineering staff of John C. Paige & Co., Boston, is a really valuable pamphlet in the cause of fire prevention—and a popular one since the firm has been compelled to publish an edition of many thousands of copies to supply the demand. How fires from accidental causes can be avoided is told in a brief and informative way. Real instruction is given to persons who actually desire to prevent accidental fires. Carelessness, however, which manifests itself in innumerable forms, not readily amenable to classification, is responsible for a vast majority of the fires in the United States. Mr. Worthington draws a parallel between Boston and Liverpool, England, in these words:

"Liverpool, England, a city much like Boston, had 706 fire alarms in 1915; Boston 2,252; and Liverpool probably has as many stoves and gas jets and contains as many smokers and uses as many matches as Boston. The people are no better nor are they more intelligent than ours. Why can not we at least equal the people of Liverpool in the exercise of care? We can not only do that, but we should better their record."

Digitized by Google

"The Man on the Job"

Prevention of Accidents by Education of Workmen, Methods of Management and Mechanical Safeguards

SAFETY ENGINEERING offers each month one First Prize of $10.00 *and one Second Prize of* $5.00 *for Articles relating to Industrial Accident Prevention. In case of a tie, the full amount of the prize will be paid to each tied contestant.*

No. 232 FAILURE TO PREVENT INDUSTRIAL ACCIDENTS. — In the past considerable attention has been given in industrial plants to safeguarding machinery that has been the cause of serious accidents. In my opinion too little attention has been given to the causes of minor accidents that are much more numerous than more serious accidents. For instance, needles on stitchers in plants manufacturing shirt waists, skirts, underwear, etc.; belt hooks on sewing machines; absence of receptacles for knives, chisels and hand saws and hand tools used by carpenters, cabinet makers and all men doing bench work.

The writer has kept a record during the past twelve years of the nature of different accidents and in viewing this record recently, I find that 75 per cent of the accidents have been caused through the absence of safeguards in connection with the conditions as mentioned in the foregoing. It is high time that the different States throughout the Union take steps to standardize safeguards. We all know that opinions differ, and in my experience I have visited plants where one inspector would recommend a certain safeguard and the State inspector another; in some instances one guard would be adequate in the opinion of one inspector and inadequate in the opinion of another.

An analysis of a large number of accidents shows among the chief causes carelessness, ignorance, insufficient lighting, unsuitable clothing, obstructed and crowded passageways in workshops, absence of safeguards, defective machinery and contributory negligence. Electricity, railroads, steam boilers, and elevators are also contributing factors, but they have been omitted from present consideration owing to the fact that they have been considered industrial dangers which have been given so much attention by mechanical and other engineers as well as persons liable to be injured that preventive measures have been generally elaborated. What is really needed in the different States are laws for safeguarding industrial workers and the enforcement of such laws by men qualified for that purpose by their technical knowledge.

From a study of the physical conditions existing in a large number of industrial plants, it would seem that the young engineer who enters upon the responsible control of industrial operations does so with little realization of the employment risks involved.

Nearly all of the articles relative to accident prevention have had reference to machines and conditions which are the most common causes of accidents. This may account for the fact that factory laws for safety do not generally bear evidence of having been formulated on a basis of careful study of the dangers with which they deal.

❦ ❦ ❦

No. 233 SAFETY WORK ON THE PART OF THE EMPLOYER.—In my experience with safety work I find it in many instances very hard for some reason or other to interest the persons who are working in an official capacity. As a general rule the employe follows the example set by his employer in order to remain in good favor with his boss.

Now this being the case, safety work can do much good if put into practice, or it can cause much ill feeling if the employer does not sanction nor enforce it.

Wherever there is a possibility of an accident, due admonition should be given

Digitized by Google

by the employer to prevent it. But if the employer allows those small defects to remain he will soon discourage the men working under him in safety work.

To encourage the employe in safety work I think it would be a splendid idea for every employer to make a trip of inspection through his department every day if possible and point out to the men the defects, allowing them to remedy the same.

In this way the employe will see that the employer takes an interest in the safety movement and in turn will follow the example set by his superior officer.

If this practice were followed out I think many hazardous conditions would be noticed before a serious accident could happen.

If these dangerous conditions were remedied the life of the working man would in a great many instances be prolonged, his limbs would be better protected and the happiness and comfort of his wife and children would be insured.

❦ ❦ ❦

No. 234 THE MAN ON THE JOB, HIS BROTHER'S KEEPER.—The "Man on the Job" is being educated by "habit of thought" to love his work, to love his home and friends, to be kind to the stranger who comes from miles away and to tell him what the company is doing to benefit its men. When the stranger comes into the educational class he is ready to receive the instruction that will make him want to remain as long as possible, advancing with the company as he knows he has the opportunity of doing. The man is also being taught that there is no position in life that cannot be bettered if a man so desires and has the right motive. A man begins his interest in the work by sending in suggestions, not so much for the prize that is offered as to show his interest in the company, knowing that whether the suggestion is acted upon or not, he will receive a letter from the treasurer, thanking him for his effort and telling him the reason why if his suggestion is not accepted. The man, being encouraged to talk at the meetings, be he groundhand or lineman, learns that it is for the good of all and that he must forget himself. He soon finds that if he has a useful thought he can express it and does, thereby gaining strength of character and increasing his usefulness. The foremen are all "on the job." They vote for what they consider the best article in SAFETY ENGINEERING under the heading, "The Man on the Job," discussing it and the other articles at the "Safety Meeting," often asking for an extension of time at their own expense in order to continue the discussion. It is always their pleasure to tell of any little incident that has occurred in their experience showing how an accident has been prevented or how the interest is being accelerated. One foreman tells how he hears the men on the poles calling to each other, "What are you doing? That is not according to rule. Mr. ——— would not like to have you do it so." Another says, "I was about to send a man up a pole to put on a crossarm, having used the block and fall as a test, when I remembered the instruction 'dig a few inches from the base and test with a chisel.' I had only heard one talk but was impressed, so I made the test, found the pole rotten in the center and pulled it down, preventing a serious accident." Another man, after listening to a talk about cause and effect, spoke of a man who had lost his life the year before, just bringing to light the probable cause of his death. He said, "I used to meet Jim every morning going to work. He was always cheery, saying 'good morning' and chatting with me. One morning when I said 'hello, Jim,' he did not answer me, and that day he was killed by disobeying instructions and carelessly coming in contact with a live wire." This man's wife was nervous and ill, and as I learned, dropped the baby that morning. He was an acting foreman, had been with the company for years and had the reputation of being a very careful man.

Another case was where one of the men took hold of 2,200 volts, falling to the ground, apparently lifeless. He was resuscitated by the men striking the soles of his feet. I was notified that his wife was very ill that morning. I afterwards found this to be true as the injured told me so, also that he could not

Digitized by Google

tell how he came to take hold of the wires. Through the men, sooner or later I find the causes of all accidents. I am thus able to reduce them, with the result that since beginning this work the number of accidents has been reduced more than 31 per cent. This I consider a low estimate, for it was a long time before all accidents were reported. Now all, no matter how trivial, are reported, thus avoiding the danger of blood-poisoning and giving facts, the knowledge of which may prevent a more serious recurrence.

There are many other instances that I could give of what is brought out at the meetings by "The Man on the Job," the only man that knows. At the meetings he feels at home and knows that what he tells is appreciated. He is not only told so at the meetings, but occasion is taken to thank him privately.

We all know how frequently men in the electrical business move from place to place, but we find that a man who is on the job does not leave now as much as formerly. He knows that it is wise to stay with a good company and be surrounded by an environment which adds to his safety and gives him an added interest in life—the consciousness that he is a useful factor in the company.

❦ ❦ ❦

No. 235

PRIZES FOR SAFETY CO-OPERATION. — Co-operation of employes is the most important factor in accident prevention work. Therefore, everything that assists to stimulate and encourage the co-operation of employes is a worth-while element in the accident prevention campaign. Prizes appeal to employes because of the honor attached to winning them, because of their value and the opportunity to participate in the contest. Special service demands a special reward outside of the day's pay, and even though the prize is not of great value it has a value in the eyes of the winner of far more than its material worth.

Years ago when rule books were first published by large industrial corporations it was found when investigating accidents that very few of the men read their rule books. Books were seldom carried in the men's pockets but, with the foreign element, were kept in their trunks. In order to get men to study their books an examination scheme was gotten up and safety lapel buttons or safety service medals were given to all men passing a successful examination of the general rules and the department rules. This plan has worked very successfully. Through such a system nearly 3,500 men employed by my company have been induced to familiarize themselves with the rule book and pass examinations.

The medal or button that they secure is a badge of honor indicating to all that these men are our best men as they have shown an interest in their work and the safety rules. We now give lapel buttons to all men for passing an examination of the rules, requesting them to call at the safety office within ten days after being employed. For six months' continuous service without loss of time, accidents to themselves or others, and passing an examination of safety rules, we give a safety service medal in the form of a bronze finished watch fob. Both of these rewards are highly appreciated. We are now engaged in checking up all foremen to see that they have passed the examination and secured buttons or medals. After we are through with that task we will send our interpreter out in the departments with the intention of having every man pass the examination. We find that when one or two men in a gang get their button or medal the others soon call at the safety office to get theirs.

Prizes for safety suggestions have assisted greatly in securing co-operation of employes. This sort of prize is of great value as it encourages all employes to search for dangerous practices and conditions and take an active interest in accident prevention work. The men thus learn how to avoid accidents as well as to prevent the occurrence of accidents to others. Frequently the suggestions made are invaluable, calling attention to obscure dangers which might have escaped detection until an accident occurred. It has been our experience that cash prizes are not desirable and that the prizes should be of a substantial

Digitized by Google

value, useful and carrying with them the safety emblem of the plant. We have given watches having the safety emblem in enamel on the back and the words, "Take Time To Be Safe" on the dial; also safety shirt sets, consisting of cuff buttons, tie clasp and stick pin, each carrying the safety emblem.

Safety congress shoes are also good prizes for suggestions, as well as many other useful articles.

We are now giving seven prizes each month as follows:

1st prize. 23-jewel Swiss movement watch in 20-year case with safety emblem in enamel on the back.

2nd prize. 7-jewel watch—similar to first prize. Made to order.

3rd prize. Gold filled safety service medal, with winner's name engraved thereon.

4th prize. Belt and silver buckle with safety emblem.

5th prize. Sterling silver pocket knife with safety emblem.

6th prize. Gold filled shirt set, each piece having the safety emblem.

7th prize. Silver key tag with safety emblem.

All of the prizes are worth having and each constantly presents the safety slogan to its owner and ever serves to remind him to be careful and avoid accidents.

All suggestions should be acknowledged and investigated as soon as possible to show the good faith of the company and its real interest in the problem of eliminating accidents.

Prizes have also been given to all employes of departments showing the greatest reduction in accident percentages each month. These may consist of dictionaries having illustrations and rules printed inside and outside the covers, sanitary drinking cups, fly swatters, or various other inexpensive articles which help to keep the safety slogan in the minds of the men.

Our experience has borne out the conclusion that prizes are a valuable factor in securing co-operation and accomplishing in an effectual way the education of employes along accident prevention lines which is so essential to success in accident prevention work.

No. 236 SAFETY DEVICES FOR PLUNGER ELEVATORS.—We find in all State and local laws, requirements for safety devices on rope lifted elevators. The purpose of this safety device is to lock the car to the guide rails in the event of over speed or the breaking of the cable or the disarrangement of any part of the machinery which might cause the car to descend at a much greater speed than its normal rate of travel. And we also find in these laws under the head of plunger elevators that this type of elevator is excepted; in other words, it will not be necessary according to the various requirements to place such a safety device on the plunger elevator. As I understand it the safety device is waived in the case of a plunger because it is said that the car cannot descend with any greater speed than the water can be displaced in the cylinder. This in a sense is accepted, but in reasoning with myself on this subject the following would be my conclusion:

Suppose a plunger elevator traveled a hundred feet in height and we will say, for an example, that the plunger was six inches in diameter. Such a plunger would weigh nearly nineteen pounds per lineal foot. This being true the plunger would weigh about nineteen hundred pounds. I think that while the plunger is submerged in the cylinder that everything contained therein is in equilibrium, but as the plunger is forced upwards and comes in contact with the atmosphere, a greater duty is imposed upon the pumping system and, due to this fact, in order to relieve the pumping system or to require less energy, it becomes necessary to counterbalance as much of this plunger as possible. I think it has been found that about 50 per cent of the weight of the plunger is as much as can be counterbalanced, because when the car is at the top of the hatchway the cylinder is full of water, and it requires about 50 per cent of the weight of the plunger to displace the water in the cylinder and overcome the friction in the pipes in order to discharge that water back to the open tank. The counterbalance on such elevators is composed of as much counterweight as is possible to balance the car and some

Digitized by Google

of the plunger. The rest of the counterbalance necessary is afforded by the heavy cables which pass over the counterweight sheave from the car side to the counterbalance side as the plunger rises. We will suppose then, that when the car is sixty feet in height that the plunger breaks loose from the bottom of the car. It will be seen that the greater amount of counterbalance will be on the counterweight side and according to the laws of gravity the weights must descend and the car be forced to the top of the house with whatever speed the overbalance has power to force it. In such a case it would be only reasonable to expect that the car coming in contact with any great speed with the overhead beam will be torn loose from the counterweight cables and will be free to fall. If this is correct, then a question arises. Why should not a plunger elevator be equipped with two safety devices? One to keep it from falling up and the other to keep it from falling down? Another point might be answered on this type of elevator and that is in the event of the water becoming so low in the pressure tank as to allow the air to pass over into the cylinder. In this case the plunger would be forced up so long as the air pressure was sufficient, but in the event of the operator's reversing the direction of the valve, it seems to the writer the car would have to fall as far as it was forced up by the air. In case the car was forced by the air to any great height the fall would be so great when the valve was reversed that a safety device would play a very cheering if not a very important part.

The writer recently rode in an elevator in one of our large cities when the car slid about twenty-four feet upward after the valve had been centered. This was evidently due to too much counterbalance. In such a case I think it will be seen how easily the air would take care of this elevator on the upward motion before the operator was aware of what had happened, and what might result in the event of the car's being equipped or not being equipped with a safety device when the car attempted to descend. It is, therefore, the writer's contention that a plunger elevator should be equipped with two safety devices or with a safety device which will prevent such a car's attempting such an unusual prank as trying to fall up or to fall down.

In conclusion I would like to say that this article is not for the purpose of teaching those who have been delegated to enact laws or to formulate and promulgate rules for the government of such elevators which the article treats. It is simply suggested for the purpose of asking those so delegated to enlighten the writer upon those things which he does not appear to understand.

❦ ❦ ❦

No. 237 THE NEED OF SAFETY SUPERVISION.—In large and small plants, in all sorts of establishments, the greatest drawback to safety efficiency is the neglect to see and know whether safety recommendations are made, made promptly, and made properly. It is easy to agree as to a hazard or as to the need of safeguarding. It is not so easy to put it through promptly and properly.

Promptness is essential. Safeguarding is like one's personal life or fire or accident insurance. If one is going to do it, it should be done at once, and the sooner the better. How often has an uncompleted safeguard opened the way for a painful, distressing accident, that could have been prevented if the man responsible had "got up on his toes" and acted at once. For the sake of safety do your safety jobs quickly. Production just now overshadows everything, but it shouldn't interfere with "Safety First," as it too often does in plants that use that motto. One would think that they interpret it as meaning "Busy now, safety tomorrow, next week, next month, or any old time." Proper safeguarding is essential. An insufficient, poorly devised, poorly made safeguard is poor business sense and shows a lack of real appreciation of what the safety movement is all about. A guard should have all available brains mixed with its making. It should be just as complete and efficient as it can be, though not necessarily expensive. It is nothing short of criminal to set up a makeshift

Digitized by Google

simply to stall the inspector. You are not cheating him, you are cheating yourself and your associates if you try that.

Most essential of all is to see that the recommendations are carried out. The man with the most authority should do that or cause it to be done. Preferably do it himself, and know that orders have been obeyed. How many of the presidents, managers or general superintendents who read this know that recommended safety work is done and done right? How many theater managers themselves know that their fire risks are eliminated or lessened, how many picture show owners or managers know the condition of their own machine booths or exit doors, exit lights, and other details? How many men conducting even small businesses absolutely know they are right from a fire, safety or labor law viewpoint? Alas, too few! Therefore—not only agree to do it, but do it at once and beat the time allowance. Do it well, do not waste time and money on inefficient makeshifts.

Lastly know that it is done, and well done.

Prizes for July Articles

First Prize. No. 231. I. L. Lockney, Deputy, Industrial Commission of Wisconsin, Waukesha, Wis.

Second Prize. No. 228. Charles L. Johnson, Foreman, New York & Queens Electric Light & Power Company, Brooklyn, N. Y.

Honorable Mention. No. 227. John F. Long, Frisco Lines, Springfield, Mo.

Other meritorious articles were contributed by O. A. Bowen, Secretary Central Committee on Safety, Public Service Company, Chicago, Ill.; E. C. Schmid, Assistant Safety Inspector, Steel Works Branch, National Enameling & Stamping Company, Granite City, Ill.

Comments by Members of the Committee

Article No. 230 appeals to me. To express the proper method of procedure to bring about the ideal of "Safety First" start with the young, who, being brought into its ways, are later the ones to become the teachers. The true worth of "Safety First" can be obtained only through thorough education, co-operation and obedience to others.

❦ ❦ ❦

Each article in the July "Man On The Job" section has merit. It is unfortunate that so many good ones should be in competition. No. 231, however, gets my vote for first prize. I do so with a feeling that it is the best article. It is so closely allied with my own ideas, that my pen, if endowed with the author's ability as a writer, could not have carried it through more forcefully. Each paragraph has a meaning, and the article should be on the desk of every safety engineer.

❦ ❦ ❦

"The Man On The Job" articles, July number, are all good, and show that safety writers are constantly broadening their views of safety matters. It is well worth any reader's time to carefully peruse the July number. No. 231 is my choice for first prize. The writer has brought out some excellent points. No. 227 is also well written, and I admire the writer's method of stating the facts treated. I am pleased to note that such good suggestions are given in the articles from month to month, and never fail to pass a month without being able to use one or more of the ideas thus gathered. If all safety men would make up their minds to use one new safety suggestion each month, and keep it up, what wonderful results would soon be real-

Digitized by Google

ized! It would not be long before conditions would become 100 per cent safe. The question should not be, can we reach 100 per cent, but rather let us all say: "We *will* make conditions 100 per cent safe."

My vote goes to No. 227—not because it is the best safety article, but because it has hit upon a great truth. A lot of safety boosters are wolves in sheep's clothing. I know of one man in the United States carrying the title of safety supervisor in a plant with over 1,400 names on its payroll who, in private life, dubs the safety movement a joke. A man who uses the safety game merely as a means to a personal end is a crook. Likewise the man who is always howling about cost is another guy who is fooling himself.

After reading "The Man On The Job" articles and studying them carefully, I feel justified in placing my vote with No. 229. Upon inspection, many different manufacturing plants will be found to have all kinds of safety appliances and danger signs throughout the plant. But the employes are not properly instructed nor severely enough dealt with when they do not pay attention to signs or if they remove safeguards. For this reason I favor No. 229, as regards more properly standardizing plants in the "Safety First" movement.

I beg to acknowledge receipt of your very kind letter of July 31 enclosing check for $10. Please accept my thanks for both. It is indeed gratifying to me to be the writer of an article which secured the commendation of your committee of award, the court of last resort in safety matters, whose opinion I value highly. I will be glad to send articles from time to time and feel that, leaving the prizes out of consideration, the opinions pro and con as published are very valuable in themselves to anyone interested in accident prevention. —*Ralph W. Immel, American Smelting & Refining Company, Globe Plant, Denver, Colo.*

No. 231 receives my vote for first place because I think he has made very clear one of the main requisites of a successful safety campaign in any plant; namely, personal interest and co-operation from the management or owner down to the laborer—in addition to properly guarded machinery.

No. 227 for first choice. Although somewhat crudely presented, it is evident that the author has "been there" and knows his subject.

In my opinion No. 231 deserves first place. The author has covered his point thoroughly and the suggestions made are practical for all classes of industry.

Having read all the articles under the heading "The Man On The Job," I select Article No. 229 as being the best.

I was very gratified indeed to learn that my article on Co-operation published in "The Man On The Job" department of SAFETY ENGINEERING for June had been awarded second prize. The article submitted is descriptive of one small item of our system at the Avery Company. We have found that the time spent in talking to the men before they are put to work, along the lines described, is well worth while.

I wish also to acknowledge receipt of and thank you for your check enclosed with your letter of July 31.—*W. H. Crumbaker, Avery Company, Peoria, Ill.*

Digitized by Google

The American Society of Safety Engineers

IT is only within the last year or so that the existence of this society has become known to the public. Therefore a brief outline of its history, plan and scope may be of interest to the readers of SAFETY ENGINEERING.

Since the "Safety First" movement became general, many societies for its advancement have come into being, but the American Society of Safety Engineers enjoys the distinction of being the oldest. Its members are the pioneers in this line of endeavor.

It is an admitted fact that the "Safety First" era originated with the advent of liability insurance in this country and the men who were inspectors for safety employed by the companies transacting that type of insurance were the missionaries of safety.

Their work, however, was marred in the early days of the profession by a lack of fraternity and co-operation among themselves. This condition led to conflicting suggestions, and animosity among the employes of competing companies was rife. This spirit continued to exist and grow for many years, attaining such proportions that, instead of a healthful, friendly rivalry among the members of the profession, a deep-rooted bitterness was engendered for any one not connected with the same staff.

Criticism of co-workers led to many misunderstandings which undoubtedly retarded progress. The outcome was that a few of the older ones began to discuss ways to bring the boys together to get properly acquainted. Such pioneers in the work as John E. Anderson, then supervising inspector of the Maryland Casualty Company; E. D. Haggerty, dean of the boiler inspectors of New York City; A. A. Frazee, supervising inspector of the Aetna Life Insurance Company; James G. Shaw, supervising inspector of the Travelers Insurance Company; G. G. Mearns, C. Berry, R. Baldwin, W. J. Fitzpatrick, Jr., and D. Lamberti of the Standard Accident Insurance Company met some five years ago and formed what was known as the "United Association of Casualty Inspectors." Its object was to get the members of the profession together for their general welfare and companionship. These few pioneers held quarterly meetings, some smokers, and some educational sessions. The association grew healthfully from a few members in 1911 until today it has attained a membership of more than 150.

All of its members are men who can be classed not only as experts in mechanical and physical safety but who work for it, shout for it and think for it, first, last and all the time.

The growth of the organization may seem slow to many, but when one stops to consider that it has been attained without any spectacular effort and that the members are scattered from Winnipeg to New Orleans and from New York to the Golden Gate of San Francisco, it is a remarkably good showing and speaks well for the underlying principles of the organization.

In the latter part of 1914, the name was changed to the American Society of Safety Engineers and its legality established by incorporation early in 1915. The change materially assisted the growth as the old name led to the belief that the organization was controlled by the companies for which the men worked. This was a misconception but nevertheless it was a factor which retarded growth. Another erroneous impression that gained ground and kept some from joining the society was that it was a labor organization. That also was a belief without foundation. The affairs of the society never have been and are not now dominated, controlled nor influenced by any outside corporate interests. At no time did the officers and members

Digitized by Google

contemplate or desire a society similar to a labor organization. Not that they are opposed to labor or capital, but the duties of the members require association and dealings with both; therefore the society must at all times maintain an unbiased and unprejudiced attitude toward all.

The change in name is believed to have dispelled all of the illusions concerning its character and aims. That there may be absolutely no misunderstanding a description of the society's objects may not be amiss.

The society is working to induce and conserve a spirit of fraternal co-operation and sociability among its members, and to provide for all the opportunity to attain the highest point towards the goal of perfection by the dissemination of useful knowledge, thereby enabling the members to be of greater service in the safeguarding of the life and limb of their fellowmen. These are the sole objects of the society and their attainment is sought by personal discussion and such knowledge as may be gleaned from lectures.

Meetings are held on the last Wednesday of each month, in the Engineering Societies Building, 25 West 39th street, New York City. Eight of the twelve yearly meetings are devoted to addresses and lectures on topics of professional interest. The others are devoted to routine business, technical matters and smokers.

The society has recently broadened its scope and amended its constitution to admit associate members.

The qualifications for active membership are that the member must devote his entire time to safety engineering work and must have been engaged for at least one year in those duties.

Associate members are required to devote a part of their time to safety engineering and be qualified to cooperate with engineers in the advancement of knowledge to prevent accidents and conserve human life.

The society's affairs are managed by a board of directors consisting of nine members, a president, vice-president, treasurer and secretary. Technical matters are referred to a committee of the whole subdivided into five subcommittees on industrial plants, electrical matters, structural matters, liability matters and elevators.

An educational and entertainment committee of five members takes care of those matters. The entertainment end of the society usually consists of two functions, a banquet held about the first of March and a frolic and shore dinner in September, which this year is set for September 9 when the members will journey to Witzel's Grove at College Point, for a day of relaxation and good fellowship.

Every member of the society believes that the profession of safety engineering is one of the greatest vocations in the world.

The doctor performs a useful service healing the sick. The surgeon assists his fellow man by repairing broken and diseased parts of the human anatomy. The safety engineer's scope is equally beneficial in that it is his task to remove, if possible, the causes that contribute to illness and injury. It is a service quietly performed without regard to class, creed, color, sex or nationality. The benefits derived from his labors and thoughts are enjoyed by the rich and poor, Christians and unbelievers, black, white, yellow and even the red man; men, women and children of all nationalities and every clime.

The human body is the greatest achievement of all ages. A wonderful piece of mechanism conceived by a master mind, all moulded alike and yet unlike. The owner of a machine of such delicate, intricate, yet sturdy structure, capable of performing one-tenth of the variety of work of the human body and brain, would guard it with every known device to prevent an injury. We read in periodicals and newspapers every day of innumerable injuries to workmen and others which could have been prevented by forethought.

The wastage of human life and limb in the United States has been appalling. No country in the world can approach it for disregard of that which is the birthright of every individual,—

Digitized by Google

life and the possession of all the natural faculties and members.

Commercialism has run rampant throughout the country. Employers have in the past sacrificed safety for production. Labor has been plentiful and when an employe has been killed or injured, there have been a hundred others ready to jump into his place. But times have changed. The employer no longer considers the lives of his workers valueless. Experience and dexterity now count, thanks to the pioneers of the profession who have for years been doing missionary work in the propaganda of safety. This work is now bearing the fruits to which it is justly entitled. The employer of today considers his boys an invaluable asset which must be protected at almost any cost.

An organization which has the pioneers of safety work for members and aims for the education of its members to the highest point of efficiency must deserve the support and good will not only of employers and employes but also of the entire population.

Plans are afoot to make the society a nation-wide organization with branches in the prominent industrial centers.

The motto of the society is "Always Safety-Onward, Safety Everywhere."

"The Fight Against Fire"

Prizes for July Articles

First Prize. No. 110. *William Philip, Consulting Efficiency Engineer, South Orange, N. J.*

Second Prize. No. 111. *Robert C. de Rosset, Jr., Clayton Giles & Son, Insurance, Wilmington, N. C.*

Comments by Members of the Committee

I vote for No. 110. Co-operation is one of the most important principles and the ideas for co-operation in fire prevention are good ones. The "get-together" spirit has been neglected in this connection but it could be as practicable here as elsewhere. The movement for community co-operation is spreading as never before.

Both No. 110 and No. 111 are excellent and both include suggestions for things already existing to some extent, but it seems to me that the subject of No. 110 is the more vitally important, especially as it involves a larger reform than itself. Such co-operation would necessitate standardization of fire couplings and certain apparatus for which we have been struggling for years. Effective co-operation without at least local standardization would be impossible, and local standardization would generally mean adoption of the national standards. The proposition involved is a far reaching one.

I vote for No. 111. Appeal to self interest is the supreme appeal; and the author has brought this point out very clearly, giving an example.

In my opinion No. 111 would be most beneficial in general results, more lasting in the minds of those who should read it. The sign illustrated would cause more thought and observance, hence would do more good as a whole. Therefore I vote for No. 111.

Digitized by Google

MATERIALS, APPARATUS, PROCESSES

IN THIS DEPARTMENT APPEAR REVIEW-ARTICLES ON PRODUCTS WHICH CONSERVE LIFE AND PROPERTY. THIS INFORMATION IS SECURED LARGELY FROM MANUFACTURERS. WE ACCEPT NO PAYMENT FOR ITS PUBLICATION

WORKING MODELS FOR "SAFETY FIRST" DEMONSTRATIONS IN KANSAS

The illustration shows a working model of attachments for automatically moving a cone belt from step to step on drills and lathes. Models were made for use by the State of Kansas Safety Museum in Topeka. The museum gives information that the models will be taken out on "Safety First" lectures all over the State.

It is the purpose of the "Safety First" movement in Kansas to demonstrate by these models that the danger incurred by a machine-hand, by shifting the belt by hand, can be eliminated by the use of automatic belt shifters; and these shifters will also aid in the production of a machine.

The automatic belt shifter itself is so simple that it requires little description. It consists mainly of a T-shaped part, the T being tilted to a sidewise position, pivotably and slidably, mounted on a pivot rod. The vertical portion of the T constitutes the shifter rod and has belt loops mounted thereon, while the horizontal portion serves as an operating lever. The operating lever is riveted to the shifter rod and offset to form a lateral lug, wherein is drilled a hole loosely engaged by the pivot rod. The latter is screwed into a column (representing a drill press column). The operating lever is engaged by a retaining strap and has locking notches formed along the lower edge adapted to engage the retaining strap, and so lock the belt in normal position on any cone step. To shift the belt it is only necessary to move the handle the width of the belt. That is, to disengage one locking notch and engage a succeeding one.

To insure shifting of difficult belts two belt loops are spaced a few inches on opposite ends of the shifter rod. The advantage thereof is clear. The servitude of a single belt loop is limited because a difficult belt may adjust itself in a long bend above the loop and so refuse to enter the cone step. Two spaced loops guide the belt so that the edgewise spring therein is utilized to force it on to the cone step by action of the shifter.

This method is tested out by experiments and proves as sure as a trained human hand or an old fashioned beltstick.

This plain style of automatic belt shifter is used on drills, shapers and other machines with low belts. It is also used on some lathes where the countershaft is not excessively high. But when the center of the cone belt is above convenient reach by the machine operator, as is the case on most millers and some lathes, a special vertical operating lever is arranged. The same principal parts—the movable T-shaped shifter rod and operating

Digitized by Google

arm, and the stationary pivot rod are employed. An extra guide rod engaged loosely by a staple is used to give a rigid position to the shifter rod, laterally allowing the belt to run free through the loops and so prevent undue belt wear incurred by a taller shifter.

The operation of this shifter is imparted by a vertical handle pivoted and connected by a link to the shifter rod. The lower edge of the operating arm is formed with a serrated edge which rides on a pilot, and by co-operation of the pull spring imparts the rocking movement necessary to shift the belt from one cone step and on to another.

The belt is locked in position by a simple pin and opening feature—one pin for each cone step being located on the segment.

The support for the shifter resides in a stiff channel iron post suitably bent and fastened by only two screws to the rear of the lathe bed.

The belt is shifted by moving the handle from one locking pin to engage with the next one. When it is desired to move the belt more than one step the handle is moved uninterruptedly until the desired beltspeed is reached.

Similar models are now on exhibition in the State Factory Inspection office on Dearborn and Harrison streets, in Chicago, where visitors are welcome to examine same.

Nils F. Larson, P. O. Box 250, Chicago.

TAKING ANNUAL INVENTORY OF ACCIDENT HAZARDS

A modern idea in safety being promulgated by the Universal Safety Company is that of taking annual inventory of accident hazards and safety accomplishments. This idea has merit, and will no doubt be generally employed by plant owners, in that it supplies a demand heretofore ignored by all who were capable of rendering the service required.

The inventory is called a "plant survey" by the originators, in that the hazards are not only listed and valued, but these listings are supplemented by instructive recommendations for the elimination of the hazards contained.

The survey is divided into three principal parts—organization hazards, physical hazards, and recommendations, with legends interpreting the symbols, and explanations of special terms. This naturally follows very closely the compensation rating scheme adopted by the State wherein the plant is located, and is therefore useful for checking compensation insurance rates. It serves the manager of the plant by giving him an accurate statement of the work done by his safety organizations, and the value of that work. It gives him a basis for estimating the cost of new work contemplated, and it gives him the basis for calculating the returns from the necessary investments required for contemplated work.

It serves the safety inspector of the plant as a score board of his accomplishments, and as the basis for his annual report to his employer. Generally speaking, it is one of the long steps toward putting safety on a business basis, on a basis of dollars and cents rather than sympathies and humanitarian interests, and should be invaluable to the man who regards safety as a business proposition, and not as a charity, which, of course, is the final analysis of the whole problem.

FIRST AID EQUIPMENT

All large industrial establishments need an emergency hospital furnished with first aid equipment for giving prompt treatment to injured employes. No industrial "Safety First" campaign is complete which does not provide for the treatment of the injured. Delay in the treatment of injured persons has often proved very costly and sometimes fatal.

The Bernstein Manufacturing Company, Philadelphia, Pa., manufactures high grade aseptic hospital furniture, sterilizing and disinfectant apparatus to meet the needs of industrial plants. The Bernstein all-steel equipment has been favorably known for 25 years to a large number of manufacturing concerns who maintain first aid rooms. Every part of this first aid equipment has been developed and designed for practical use. It has sanitary and aseptic finish in best white enamel backed by the Bernstein guarantee.

In addition to the extensive line of hospital furniture this concern also manufactures on a large scale steel equipment for factory, office, railroad, college, and gymnasium use. In accordance with the requirements of "Safety First" standards steel equipment is coming into extensive use in industrial plants. Steel lockers, steel shelving, steel files, chairs, steel filing cabinets, etc., are contributing towards securing safer conditions in industrial plants. Complete catalogues concerning the above mentioned products will be gladly sent by the above mentioned manufacturers.

SAFETY DEVICES FOR ALL INDUSTRIES

The Safety First Supply Company, Pittsburgh, Pa., has been organized for the purpose of supplying safety appliances and devices needed in the different industries. This company states that the industrial safety engineer heretofore has had to do business with many different concerns in securing the various devices needed in accident prevention campaigns, whereas he can now obtain through the Safety First Supply Company, any article he needs.

This company will maintain on the 11th floor of the Hartje Office Building, Pittsburgh, a comprehensive exhibit of devices it can supply. In this exhibit is included an industrial hospital, first aid supplies, stretchers, emergency outfits, etc. The men associated with this enterprise are H. B. Lacy, President; H. W. Dinker, Treasurer, and E. F. Shipman, Secretary. Mr. Lacy has spent a number of years in close touch with the coal mining industry. Mr. Dinker specializes in

Digitized by Google

fire prevention and fire fighting apparatus. Mr. Shipman has been identified with one of the largest power companies and possesses a knowledge of the requirements of the varied industry.

CHANGE IN PYRENE STAFF

The Pyrene Manufacturing Company, New York, has recently appointed T. F. Flanagan general sales and advertising manager, left vacant by the appointment of C. L. Allen to the presidency of the company. Mr. Flanagan's career has been very successful with the Pyrene Company, having joined this organization about 14 months ago as assistant advertising manager.

This company has recently added a complete line of fire appliances to its catalogue, and is planning a great extension in its business. This means a great amount of extra work for the sales department. The Pyrene Company, although doing a successful national and international business is but a young concern. Pyrene Fire Extinguisher sales are now close to the million mark.

UNDERWRITERS' LABORATORIES

Recent Approvals and Reapprovals

"AMERICAN" PAILS IN TANK. Rowe & Son., A. C., Submittor, New York, N. Y. Approximate capacities, 25 gal. tanks and six 10 qt. pails, and 40 gal. tanks with six 14 qt., or nine 10 qt. pails.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Western Inspection Co., manufacturers, Buffalo, N. Y.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Victor Fire Extinguisher Co., manufacturers, Toronto, Ont.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Stempel Fire Extinguisher Mfg. Co., The, manufacturers, St. Louis, Mo.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Standard Extinguishing Co., The, manufacaurers, Boston, Mass.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Racine Iron & Wire Works, manufacturers, Racine, Wis.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Pittsburgh Lamp, Brass & Glass Co., manufacturers, Pittsburgh, Pa.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Northern Fire Apparatus Co., manufacturers, Minneapolis, Minn.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. National Metal Stamping & Mfg. Co., manufacturers, Newark, N. J.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Missouri Lamp & Mfg. Co., manufacturers, St. Louis, Mo.

CHEMICAL EXTINGUISHER, 2½ GALS. BREAK BOTTLE TYPE. Minimax Co., manufacturers, New York,, N. Y.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Miller Chemical Engine Co., manufacturers, Chicago, Ill.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. McMorran Co., Edward E., manufacturers, Chicago, Ill.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Knight & Thomas, Inc., manufacturers, Boston, Mass.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Harker Mfg. Co., manufacturers, Cincinnati, Ohio.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Garth Co., The, manufacturers, Montreal, Que.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Diener Mfg. Co., Geo. W., manufacturers, Chicago, Ill.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Childs Co., O. J., manufacturers, Utica, N. Y.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE.. Buffalo Chemical Fire Extinguisher Co., The, manufacturers, Buffalo, N. Y.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Boyd & Bro., Jas., manufacturers, Philadelphia, Pa.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Booth-Coulter Copper & Brass Co., The, manufacturers, Toronto, Ont.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Badger Fire Extinguisher Co., manufacturers, Boston, Mass.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Bentley Mfg. Co., The E. A., manufacturers, St. Louis, Mo.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. American-La France Fire Engine Co., manufacturers, Elmira, N. Y.

CHEMICAL EXTINGUISHER, 1 QT. STORED-PRESSURE TYPE. Electrene Co., The, manufacturers, New York, N. Y. Hand chemical extinguisher made of brass, about 1 qt. capacity.

CHEMICAL EXTINGUISHER, 1 QT. PUMP TYPE. Johns-Manville Co., H. W., manufacturers, New York, N. Y. Hand chemical extinguisher made of brass; about 1 qt. capacity

CHEMICAL EXTINGUISHER, 1 QT. PUMP TYPE. Justrite Mfg. Co., The, manufacturers, Chicago, Ill. Hand chemical extinguisher made of brass, about 1 qt. capacity; operated by rotating handle at forward end of extinguisher to force solid plunger forward.

CHEMICAL EXTINGUISHER, 1 QT. PUMP TYPE. Pyrene Mfg. Co., manufacturers, New York, N. Y. Hand chemical extinguisher made of brass and composition metal. About 1 qt. capacity. Similar in design and method of operation to a large double action syringe. "Pyrene," a liquid, is used as extinguishing agent.

COUNTERBALANCED, TIN-CLAD, ELEVATOR DOOR. Peele Co., The, manufacturers, Brooklyn, N. Y. Tin-clad fire door with counterbalanced sliding sections fitted with chains, rods and pulleys and vertically mounted in built-up guides.

"CORCO"-PAILS IN TANKS. Wheeling Corrugating Co., manufacturers, Martins Ferry, Ohio. Approximate capacities: Tanks, 22 and 32 gals.; pails, 12 to 14 qts.

ELEVATOR INTERLOCK, SHUR-LOCK ELEVATOR SAFETY Co., Inc., manufacturers, New York, N. Y. Mechanical appliance for interlocking shaft door and car control lever.

EXPANDED METAL FOR GUARDS. The Consolidated Expanded Metal Cos., manufacturers, Braddock, Pa. Diamond-mesh, expanded, open-hearth sheet steel.

ENCLOSED SWITCH. General Electric Co., manufacturers, Schenectady, N. Y. Three-pole motor starting switch.

"ERWIN" AUTOMATIC FIRE EXTINGUISHER. Treadwell Co. of Illinois, M. H., manufacturers, Chicago, Ill. Stationary automatic foam fire extinguisher for use in connection with containers, up to 55,000 barrels capacity, holding crude oil, benzine, naphtha, gasolene and benzol.

ENCLOSED SWITCH. Metropolitan Engineering Co., manufacturers, Brooklyn, N. Y. Two-pole knife switch of special design and cutout bases for standard plug fuses. Enclosed in metal case and designed for manual operation without opening case. 30 A. 125 V. No. 1200.

FIRE PAIL, 12 QTS. Eureka Chemical Fire Pail Co., manufacturers, Philadelphia, Pa.

FIRE PAILS, 8, 10 AND 14 QTS. Fibre Corporation, manufacturers, New York, N. Y.

FIRE PAIL, 12 QTS. Waggoner Sanatory Fire Bucket Co., manufacturers, Chicago, Ill.

FIRE PAIL, 11 QTS. Swain, H. M., manufacturer, 11 Bank St., Philadelphia, Pa.

"SAFETY" FIRE BUCKET TANK. Republic Metalware Co., manufacturers, Buffalo, N. Y. Approximate capacities: Tanks, 25 and 40 gals.; pails, 10 and 14 qts.

Digitized by Google

SAFETY ENGINEERING

Vol. 32 SEPTEMBER, 1916 No. 3

Copyright, 1916, by The Safety Press, Inc. All Rights Reserved

Current Comment and News

Photo by Social Press Assn., N. Y.

A Crash at the Entrance to the Pennsylvania Tunnel under the Hudson River on September 16. Two Persons Fatally Injured, a Score or More Slightly Injured

TWO Pennsylvania passenger trains tried to enter the tunnel under the Hudson at the same time on the morning of September 16. Confusion of signals or the failure of brakes was apparently the cause of the accident, the first serious one since the opening of the Pennsylvania tubes several years ago. An electric motor engine, taking the crossover at the entrance to the north tunnel, crashed into the fifth coach of a six-car passenger train bound for Washington. The Washington train, with several hundred passengers on board, received a signal to stop about 100 feet from the entrance to the tunnel. This block was lifted shortly and the train proceeded. Opposite, on a track running parallel and likewise bound for the tunnel, was a yard engine with a string of "dead" passenger coaches in tow.

The Washington train had entered the

Digitized by Google

tunnel, when the yard engine reached the switch. Evidently, the driver had not seen the signal, for a moment after the big electric motor took the cross-over and crashed into the fifth car of the passenger train.

The impact demolished the steel coach. Passengers were hurled in all directions.

The crash lifted the car completely from the rails and drove it on to the roadbed. Passengers said the motor literally cut its way through the steel frame of the coach. All the injured were passengers in the fifth coach of the Washington bound train.

Photo by Social Press Assn., N. Y.

Safety Screens on a New York Elevated Train During the Recent Strike

AMONG the accidents of the transit tie-up in New York City were smashes of street cars, jitneys and Interborough steel coaches. Passengers were killed and injured. To protect the motormen of street cars and elevated and subway trains, heavy wire screens were placed around the fronts of cars. Several jitney accidents occurred in the suburbs as well as in the city, although all of them were not due directly to the strike in New York City.

THE Safety First Society of America has perfected plans for a nation-wide campaign to educate pedestrians to use the crosswalks instead of crossing the streets diagonally, or in the middle of the block. For the purpose of raising funds to carry on this campaign, an appeal is made to the owners of all motor vehicles to contribute sums of $1 or more, the campaign to be conducted through the constituent organizations of the Federation and through the co-operation of the newspapers throughout the country. A number of new safety devices are on view in the Safety First Exposition at the headquarters of the Federation at 6 East 39th street. One of these is a new headlight device which, instead of concentrating the rays of light and making a dangerous glare, gathers the rays and diffuses them so that while the blinding glare is eliminated, the light itself is not lost. Another is a new illuminated license tag which has not yet been put upon the market. Last October, at the first annual convention in Detroit, the Federation expressed its belief "that the problem of identification

Digitized by Google

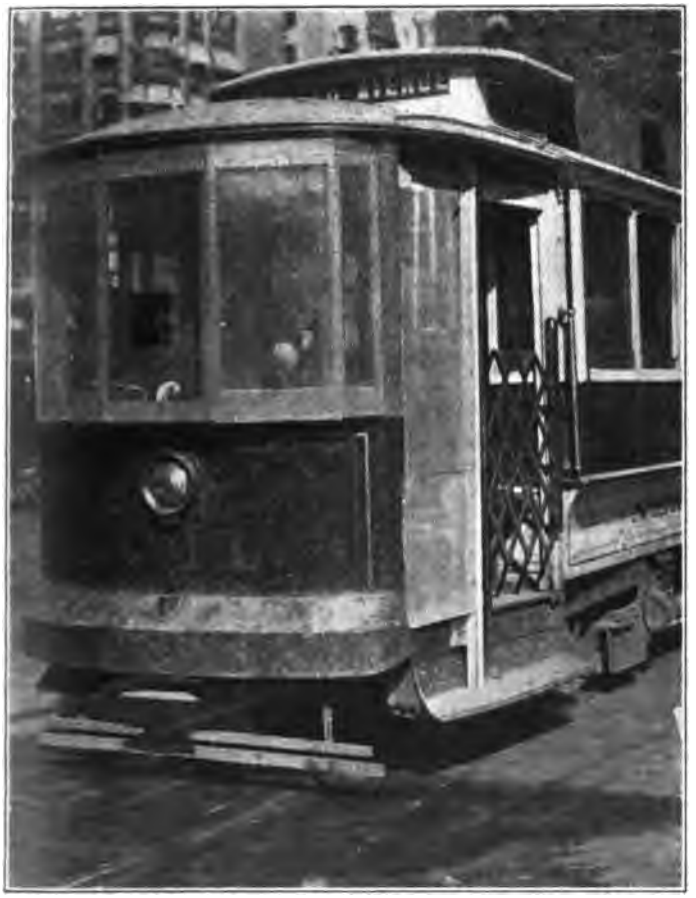


Photo by Social Press Assn., N. Y.

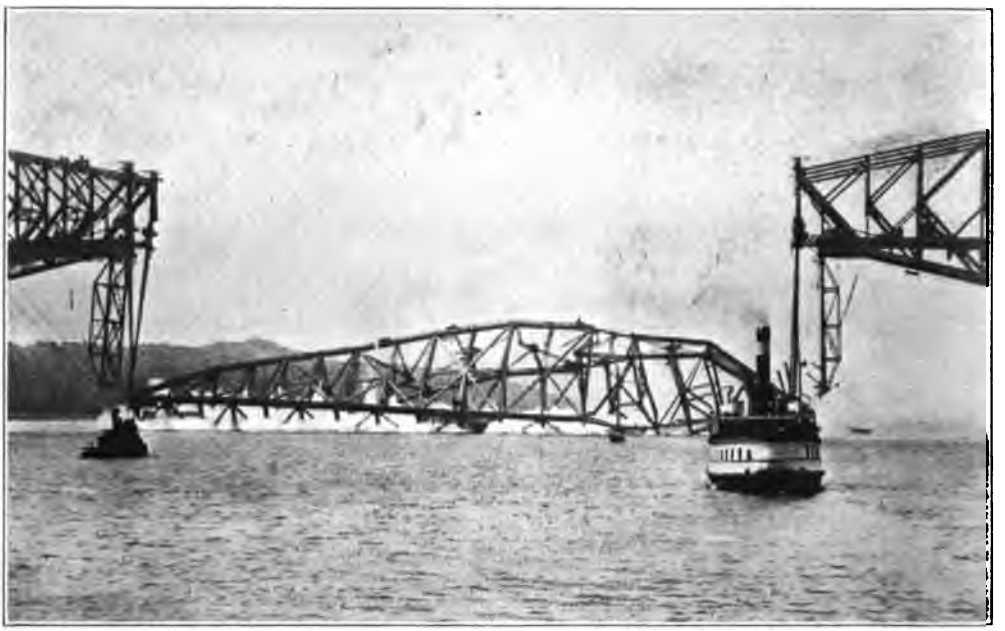
Safety Screens on a New York Surface Car During the Recent Strike

of cars by license plates will never be satisfactorily solved until motor vehicles are so constructed as to provide both in the front and rear for the license plates transparently illuminated." At that time there was no such device upon the market. Since then the officers of the Federation have been hoping that some inventor would discover a satisfactory method of producing such tags at a reasonable cost. This hope has apparently been realized and it is expected that the new device will be submitted to city and State officials in the near future.

THE Quebec Bridge is an engineering problem of magnitude. In 1907 a part of the bridge collapsed under its own weight, causing the death of many workmen. It was ascertained that the girders were not heavy enough. On September 11, 1916, nine years after the first disaster, the 5,000-ton central span slipped off the lifting girders and plunged to the bottom of the St. Lawrence, causing the death and injury of many workmen. The problem of completing this remarkable bridge remains to be solved, and the work will be completed beyond a doubt. The best account of the recent disaster is from the pen of Harry Barker, who is a member of the staff of the *Engineering News:*

"At 9:22 a. m. the span cleared the scows, the south end lifting apparently a few seconds first. The scows then drew to one side, revealing the spectacle of the great 640-foot span hanging suspended from the lifting chains. Everybody believed, of course, that the crucial and difficult stage of the work was past and the rest was merely a routine operation. Four lifts of two feet were taken with the north jacks and five lifts with the south jacks. At 10:46 a. m. one additional lift had been taken at each cantilever, making five lifts at the north end and six at the south. At this time on each side of the river the top jacking pins were out; the bottom jacking pins were in, and the top girder was descending for another cycle. The weight of the suspended span was hanging from the lower or fixed jacking girders and everything apparently was stable and secure. At this moment something, somewhere, gave way on or about the

Digitized by Google



Copyright by the International Film Service.

The 5,000-Ton Span of the Quebec Brdige at the Moment It Slipped into the St. Lawrence River on September 11

suspended span, far below the level of most of the observers. What that initial failure was every engineer in every branch of the profession will earnestly desire to learn, for concededly this bridge represents the height of constructional effort. The descriptions of witnesses permit an answer to the puzzle—in fact several answers, wherein lie doubt and confusion for the present. Several combinations of circumstances can be formulated to agree more or less closely with all the evidence at hand. At 10:50 a. m. the attention of the closest observers was attracted by sounds that seemed to tell of serious structural failure. To some there was a noise like the discharge of a cannon, followed by a lighter crackling."

Photo by Social Press Assn., N. Y.

Wreck of an Automobile Bus During the Recent Transit Tie-up in New York City. The Jitney Was Struck by a Runaway Trolley Car in the Hands of a Green Crew. Two Killed, Twelve Injured.

Digitized by Google

The Successful Safety Engineer

By the Late George Gilmour

An Address delivered before the American Society of Safety Engineers

I HAVE taken the liberty of departing to some extent from the subject assigned to me, namely, Industrial Safety, because a few thoughts have occurred to me along another line, possibly more interesting and valuable than the reiteration of certain facts and principles that you are already familiar with. Doubtless, even in the remarks that will follow, there are many points that have occurred to you already, but I trust there may be some new and helpful suggestions, and that even the familiar topics may be presented in such a way that you may obtain some inspiration from them.

I have selected as a title for this paper, "The Successful Safety Engineer," and I shall endeavor to describe to you some of the qualifications that seem to me most essential in the development of a safety engineer and some of the work required of him aside from his ordinary routine duties.

Before taking up my principal subject this evening permit me to congratulate you on your selection of a name for your society. While men in your profession are commonly known as inspectors, I believe that you have acted wisely in substituting the term "safety engineers," because it is a more comprehensive title and more clearly defines the duties of the members of your organization. Moreover, the meaning of the word inspector, as defined in the Century dictionary, is "One whose duty it is to secure *by supervision* the proper performance of work of any kind." I need not tell you that an inspector of an insurance company, or of any other similar organization, has no power to *enforce* regulations with regard to safe or proper procedure in any operation, but only to *recommend* such changes as may seem to him advisable under the circumstances. Nor would it be desirable, even if it were possible, to delegate authority in this way to an outsider, because it would only cause ill-feeling on the part of the insured's superintendents and foremen and would, doubtless, influence adversely the spirit of co-operation that is so essential between the insurance company's representative and the insured's employes.

Furthermore, the scope of a safety engineer's duties is far broader than that of an inspector whose oversight and jurisdiction may cover but a single department, operation or process. Training and experience along one line may be sufficient in such an event to make an inspector exceedingly valuable. A safety engineer must be well qualified in all directions to be thoroughly successful. and the study, training and experience necessary to attain the highest degree of proficiency give him more than a superficial knowledge of a variety of subjects and make his advice invaluable.

Specialization in certain directions is exceedingly important if the service rendered is to be really valuable and practical. It must not become too narrow or a man will become contracted in thought, will work in grooves or ruts and will be denied the stimulating and developing effect that broader activities produce.

The visits of the safety engineer to the premises of the insured are called *inspections* for lack of a better word, but they should, and usually do, include something more than a brief and casual examination of the plant and apparatus. When carried out properly they form a bond between the proprietor and the insurance company that is often far stronger than any that can be established by the issuance of an insurance policy in return for a monetary consideration.

There is probably no line of work in which greater versatility is required than in making insurance inspections and making them successfully.

Considering the great number of industries covered and the endless variety of processes and special machines encountered, it is evident that the safety

Digitized by Google

engineer must have a wide knowledge of industrial affairs as well as a thorough training in engineering practice. Coupled with these requirements is a third essential, namely: familiarity with insurance contracts and the ability to interpret these contracts in terms of information desired and regulations to be enforced.

Coming in contact with the assured as a personal representative of the insurance company the safety engineer carries considerable responsibility aside from that related to his special duties. In the mind of the factory owner, the manager or superintendent, a distinct impression is created, either favorable or otherwise, of the safety engineer and, through him, of the company he represents.

The routine examination of properties should be considered then as only part of the job and special attention given to the matter of discussing suggestions and the method of securing information.

Perhaps the most helpful suggestion that I can offer is this: In all dealings with policyholders keep the fact firmly fixed in mind that the property belongs to some one else; you are a visitor on the premises and not in a position to dictate. In other words, consider the proposition from the owner's standpoint and try to appreciate his feelings toward an outsider who comes in and requests changes here and there in the equipment or methods employed.

There is always a tendency to feel that the mere fact of being employed by a large, powerful corporation places one in a position to dictate or, at least, to be indifferent to the wishes of the policyholder. The point I wish to make is that while fixed rules and requirements should not be waived, all objections should be given careful attention and consideration and the counter-arguments presented should always be tempered with good feeling and kept free from personal criticism. As the popular expression goes, "Every safety engineer's middle name should be Tact." If the safety engineer can add the qualifications of a salesman to the other requisites so much the better, for an important part of his work consists in selling recommendations to the assured and in seeing that the customer is satisfied.

The personality of the salesman often has an important bearing on his ability to sell his goods. Likewise, the personality of the safety engineer plays an important part in gaining the co-operation of the insured and his representatives. Before going into a plant, even when there are no restrictions as to visitors, the safety engineer should always seek out some person in authority and explain the purpose of his visit. When possible, it is desirable to have one of the foremen accompany him in his inspection tour because this will often assist in gaining the good will of those in authority and at the same time will afford an opportunity to explain directly to a practical man the recommendations that will later be submitted in writing to the higher officials of the company. It is equally important for the safety engineer to see personally some one of the higher officials before leaving the plant, to cultivate his acquaintance and to talk over the recommendations in a general way.

The manner of placing recommendations before the insured must also be given consideration. The safety engineer must thoroughly understand his recommendations and must submit them to the assured in such a way as to convince him of their reasonableness and of the mutual benefit to be gained by carrying them out. Occasionally a man must be dealt with who does not fully realize the importance of certain recommendations, or who resents what he considers the unwarranted visits of the safety engineer. In such a case the safety engineer may be called hard names and threatened with various unpleasant consequences. If he is the right kind of man he will submit to this treatment, not because of cowardice, but because he is firmly convinced of the soundness of his recommendations and the necessity for carrying them out. In most cases, after the insured has relieved his feelings, the safety engineer will be given an opportunity to talk with the chances in favor of being able to obtain a respectful hearing. In the end he is usually able to establish good relations between the insured and the insurance company.

You all know of these obstacles and others that must be encountered, and you

Digitized by Google

realize that the safety engineer's life is not one of ease and luxury. In fact, many of you have, doubtless, felt sometimes, after receiving a sharp letter from the "boss" or being invited to get out of a plant in the shortest possible time, that it is quite the opposite and can only be described by reference to a very bad place. Having been associated with this kind of work for several years I can realize the difficulties encountered and the unpleasant incidents that are bound to develop in carrying on a business so complex and so varied. We must train ourselves to accept criticism as freely as we give it and be willing to learn our lessons when at fault without assuming any ill will on the part of the other fellow. He has troubles of his own if he has any responsibility, and if he is not in a position of authority, it need not matter, anyway.

There is a bright side, too, that must not be forgotten. The safety engineer has an opportunity enjoyed by few others for coming into close contact with many important phases of industrial enterprise. He is in touch with the old and the new in machinery and processes. He sees how things are done and compares the different ways of reaching the same end. He is also placed in a position to meet successful business men and experts in many lines of endeavor; to study human nature by observing the many types and to learn to estimate the attributes of each so that the best method of approach and argument may be followed in taking up insurance matters.

To the man who is willing and anxious to learn, this work is a continuous source of information; he is passing through one of the greatest educational institutions in existence from which no one ever graduates because the courses have no ending and the curriculum is unlimited.

I should like to speak more particularly of the increased difficulties in making inspections and submitting recommendations under the provision of the New York State compensation law and the universal inspection report. The demands of the universal inspection report are many as compared with the older form of liability reporting, not only in making out the report but also in listing and following up recommendations. Perhaps on the average, ten times as many recommendations are required with the universal report as were necessary under the former method. The fact naturally causes a corresponding amount of unpleasantness in cases where the insured is disinclined to carry out recommendations and requires additional patience and tact on the part of the safety engineer.

The merit system for the classification of risks has greatly increased the importance of the safety engineer. Under this system the ratings for various classes of risks are adjusted in accordance with the findings of the safety engineer.

Every ambitious safety engineer desires to increase his knowledge and perhaps a few suggestions as to how this may be done will be helpful. All available literature pertaining to accident prevention should be carefully read. Safety engineers are expected to have a thorough and intimate knowledge of the contents of safety publications and to use the suggestions contained in them for guidance in their work. Numerous pamphlets relating to safety are published by the safety organizations of various manufacturing companies and these contain many items of interest. Considerable attention is paid to accident prevention in many of the technical periodicals which are readily obtainable and there are numerous other sources of information available to the man who is really interested.

Every accident that comes to the safety engineer's attention should be carefully analyzed so far as available information will permit and it should be studied with a view to (1) determining the cause of the accident, and (2) discovering means for the prevention of other similar accidents; also (3) the moral hazard present in the accident, and (4) the policy coverage for the accident.

Personal records are often of great value in providing readily accessible information on miscellaneous subjects

Digitized by Google

and these should preferably be kept in a loose-leaf record book. When a particularly desirable condition or guard is observed it should be recorded so that a similar idea may be incorporated in a recommendation to some other plant where it would be applicable. Serious accidents that might have been prevented by taking suitable precautions should be recorded and the information thus preserved may be used in the future as a convincing argument when making recommendations. Photographs and sketches of guards, illustrations of safety devices and miscellaneous instructions may also be kept for ready reference. A book of this kind will prove its value in a very short time.

In our own office, and doubtless in other offices as well, the underwriters frequently complain of insufficient information in the safety engineers' reports. The tendency of the safety engineer is to imagine that the underwriter in scrutinizing the report sees the plant through the safety engineer's eyes; therefore much detailed information is omitted that would be of value to the underwriter. The report should be made as complete as possible and the essentials should be fully described. Miscellaneous information that has no particular bearing on the subject should be omitted. When the safety engineer fully understands the policy coverage he is in a position to place before the underwriter in his inspection report the information required for rating a risk. For this reason as well as others, it is desirable for the safety engineer to make a careful study of insurance contracts.

To assist the underwriter as much as possible I would suggest that descriptive inspection reports be made up under divisions approximately as follows and that the information under each heading be as complete as possible.

1. A description of the raw material received.

2. A concise description of the progress of the material through the plant.

3. The finished product and the manner in which it is packed and shipped.

In addition there are two other important items that affect every risk.

4. A description of the general physical condition as regards the arrangement and type of machines used and the operations performed by the various machines; the width of aisles, the guards that are provided and their maintenance, illumination, general orderliness and sanitary arrangements.

5. A description of the moral hazard; that is, the general character of the employes, their age and nationality, the system under which they work and the manner in which they dress. Also an outline of the system of supervision and the general attitude of the employes toward the persons in authority.

I am convinced that the moral hazard of a risk is a most important consideration, because a plant may be in first-class physical condition and yet be productive of many accidents if the moral hazard is poor. On the other hand, if the supervision is good and the employes are intelligent and careful it is quite possible that the percentage of accidents may be small even though the physical condition of the plant is not all that could be desired.

It is extremely important that a safety engineer be prompt and accurate in carrying on his work. When he receives a request from the home office asking that certain inspections be made and reports turned in on a certain date he should make every effort to carry out the program. In many cases the home office has made arrangements with other persons that depend for their fulfillment upon the prompt receipt of the safety engineer's report. In other words as much careful and detailed attention should be given to the clerical part of the work as to the inspection. A safety engineer may send in a report showing that a certain risk is particularly desirable but if the report has been delayed or held over for a week or more, the chances are in favor of the business being taken over by some other company.

I have observed a growing tendency among the employers of labor to or-

Digitized by Google

ganize their safety work. This is eminently desirable and I hope that within a short time the movement will become general. It affords a splendid opportunity for the well informed safety engineer to show that he is something more than an ordinary inspector. Doubtless the work of organizing safety departments and committees would be more rapidly extended if employers fully realized their value and knew just what steps to take in order to effect suitable and satisfactory organizations. The safety engineer should familiarize himself with this work so that he will be able to discuss it intelligently and authoritatively with the employer and aid him in planning an effective safety campaign.

It may occur to you that in the foregoing remarks I have outlined a rather comprehensive list of requirements and qualifications that go to make up a successful safety engineer and that a man who aspires to a leading position in this profession must possess all of the virtues in addition to a good engineering and business training. I believe that I have not exaggerated the importance of any of these requirements; furthermore I am confident that you all possess the necessary attainments, perhaps in a greater measure than you are aware of, otherwise you would not be holding your present positions. Let me urge you to strive constantly to increase your store of knowledge with regard to all branches of your work. As stated before, specialists along certain lines are essential but the really successful and valuable safety engineer must have a broad and varied knowledge not confined to any one branch of industry but comprising operations, processes and manufacturing equipment of all kinds.

Safety engineering as a distinct profession is comparatively new in this country. In Europe, however, where accident prevention has been studied for years the position of a safety engineer is an honored one to which young men aspire, for which they train themselves and which they are glad to take up as a career. You, gentlemen, are among the pioneers in this country and I believe that your work will be increasingly important as the necessity for safeguarding lives in our great industries becomes more fully realized.

In concluding my remarks I should like to call your attention to a phase of safety engineering that, it seems to me, has not been sufficiently emphasized; that is the potential accidents that are averted by the watchfulness and care of men like yourselves.

Many statistics are prepared from time to time dealing with the number of accidental injuries sustained by men and women employed in our industrial activities and many articles are written to emphasize the importance of the economic loss involved and to point out the vast amount of human suffering that follows. Of the necessity for presenting these facts there can be no question, and the work done in this direction must continue to increase in importance as enterprises become larger, more varied and more numerous.

There is another closely related subject, however, about which little is said and less written; namely, the number of industrial accidents prevented and the benefits derived through their prevention.

It is comparatively easy to tabulate and classify results that have become a matter of record. On the other hand, it is extremely difficult to estimate, even roughly, the saving in life and limb effected through the elimination of certain physical conditions or faulty methods. The statement that large numbers of accidents are prevented each year can hardly be questioned, but if any argument is needed to support this theory, it may be stated that the companies with which I am connected have maintained for several years a steadily increasing force of safety engineers, located in all parts of the country. In view of their extensive experience with accidents and their causes, the companies are in a position to judge the merits of preventive measures. They certainly would not continue their activities in this direction at great expense unless satisfied as to

Digitized by Google

results. During the year 1914, for example, our engineers discovered 195,073 conditions such as have proven productive of accidents, and steps were taken for their removal. Assuming for the purpose of argument, that only one in 50 would have caused a personal injury, we have the impressive total of 3,900 accidents prevented by careful inspection and the elimination of dangerous conditions.

It is a daily occurrence for a safety engineer to secure the replacement of defective apparatus found in use, to prescribe protective devices for dangerous machine parts and to see that hazardous practices are corrected. Constant association with service of this kind accustoms the safety engineer to the presence of serious hazards and he considers their removal something to be accomplished as a part of the day's work and not a matter for publicity or special mention. Even if exact detailed descriptions covering existing conditions that involve hazards could be recorded and analyzed the results would doubtless be considered indefinite or unreliable so far as the assignment of equivalents in hands, legs, eyes or lives saved.

Perhaps some genius, endowed with unlimited patience and fond of mathematical problems involving probabilities and chance, will undertake to investigate the subject and establish a system whereby correct values may be assigned to the elimination of hazards in their great variety. For the present we must be content to carry on the work in a thorough and conscientious manner, knowing that effective results are being secured, even though they cannot be expressed in cold figures.

At the home office of my company we have a large number of photographs and specimens of equipment showing serious defects which would undoubtedly have caused accidents involving severe or even fatal injuries had it not been for the vigilance of our safety engineers. You have all discovered similar conditions and you well know that in many instances, in the natural course of events, no attention would have been paid to them until accidents had occurred. I should like to describe a few of the most dangerous of these conditions in order to emphasize the necessity for thorough inspections and prompt recommendations for the installation of suitable safeguards under similar circumstances.

In one case two circular saws were located close together in a sawmill and both of them were running. While working at one of the saws a workman's hand brushed against the saw teeth. It caused no injury but startled him so that he jumped back, stumbling over some lumber which was lying on the floor. He fell and struck his head against a guard on the adjacent saw which fortunately had recently been guarded at the suggestion of one of our safety engineers. The man fell in such a way that his head would probably have been severed from his body if the saw had been unprotected.

Another specimen consists of a hoisting cable removed from an elevator used for carrying both passengers and freight. There were no safety devices on the elevator and the weight was sustained by the one cable. Practically every strand of the cable was broken at some point and the broken wires on the outside were projecting in all directions. The building in which the elevator was used is 5 stories high and you can readily understand the grave danger to which users of the car were exposed.

The inherent weakness of lap-joints in boiler construction is well known and many disastrous explosions are caused by the failure of riveted joints of that type. It is often difficult to detect incipient cracks in lap-joints, but our collection contains a section of plate showing such a defect that was discovered before any damage was done. The boiler from which it was taken was operated at a pressure of 90 pounds and the crack extended almost the entire width of one course.

A safety stop was installed on an engine in compliance with our recommendation, in addition to the regular governor. The device was undoubtedly the means of preventing a dangerous flywheel explosion when the governor failed to operate and the engine started to race.

Bursting emery wheels frequently

Digitized by Google

cause serious accidents. In a certain shop a heavy, unguarded emery wheel was used for dressing castings. At the suggestion of our safety engineer the wheel was protected by a substantial enclosure. Five days after the guard had been installed the wheel burst; the enclosure prevented the pieces from flying, thus saving the operator from injury.

I might continue almost indefintely to describe specific cases to illustrate the benefits derived from careful inspection and the prompt adoption of preventive measures. It is unnecessary to do this, however, for you are well aware of their importance. Let me urge you to continue your efforts in accident prevention work regardless of adverse criticism and opposition, knowing that, sooner or later, events will afford you ample justification for your work and reward you for your efforts.

Unsafe Practices in Connection With the Operation of Railroads

By John S. Spicer

Pennsylvania Department of Labor and Industry.

RAILROADS, both industrial and those operated by public service companies, continue to take their toll of human life. The fortunate thing, however, in connection with this type of industrial accident is the fact that, in practically every case, the accidents are due to careless practices either on the part of the injured or else on the part of a fellow employe. Seldom can their cause be laid to defective equipment or to a lack of safeguards. The greatest offender seems to be the employe who disregards standing rules. The following accidents have all occurred within a few weeks in various widely separated localities throughout Pennsylvania. Their distribution clearly shows that thoughtlessness is not confined to any one section.

A locomotive engineer, while the engine was running, went out on the running board of his engine. He was looking down at the wheels, evidently searching for a hot box or hot bearing, when he was struck by a mail crane which had been set for a passenger train. His skull was fractured and he died in the hospital two days later.

The proper time to make an examination of a locomotive is when it is shut down and standing still. No railroad company desires any employe to endanger his life in this way.

A workman in a tin plate mill was attempting to cross a railroad track at a side entrance to the mill when a shifter backed out of the mill, struck him and crushed both legs. He died from his injuries later in the day.

In this case a safeguard was lacking. Proper guard rails placed along the track so workmen could not cross directly over the tracks but would be required to walk along parallel with them for a short distance, would have given him an opportunity of seeing the approaching shifter.

An Austrian employed as a trackwalker was sitting on a northbound track removing a cinder from his shoe. He saw an engine coming on a southbound track and, becoming confused, jumped in front of the engine. He died two days later from his injuries.

Manifestly railroad tracks were never intended to be used as a dressing room.

A car inspector stepped between an engine and a coach for the purpose of making a coupling. He was not quick enough, however, in getting out and was caught between the cars and instantly killed.

It certainly is far better to stop cars first and then adjust couplings than to take the chance of attempting to do it while the cars are moving. A little steam and time may be saved, but they are hardly to be compared in value to a human life.

Digitized by Google

A yard freight brakeman was standing on the roof of a box car. The draft started suddenly, he was thrown to the ground and his head struck a cross tie. He died two days later.

Another brakeman was riding on the top of a car. When the draft broke loose while going in on a siding, he neglected to look ahead and was knocked off by a projecting portion of a building.

Constant watchfulness is absolutely necessary for employes engaged in so hazardous an occupation.

A railroad crew of an industrial concern was attempting to remove a car from a siding by means of a chain instead of a regular coupling, which they had difficulty in operating. The siding was on a slight grade and when the chain broke the car ran down the grade a short distance, became derailed, and crashed into a small tool shanty in which an employe happened to be at the time. His injuries were so serious that he died the next day.

The company reporting this case stated, "The circumstances surrounding this accident are similar to those found in the majority of cases where the persons responsible are criminally negligent. The result being, as is often the case, that the innocent are made to suffer." How true the statement is and how unfortunate that such circumstances occur so often!

An Italian laborer was engaged in shoveling out a car of cinders. He had finished the work at his end of the car and climbed up and sat on the end of the car to rest. A shifter shunted two cars against the car he was sitting on and the jar caused him to lose his balance. He fell beneath the car and was instantly killed.

It is obvious that an accident of this type can be eliminated only by means of educational work, showing employes by bulletins and safety talks the dangers of such practices.

Many more individual cases could be cited, but the lessons to be learned would differ very little. Accidents never will cease unless employes think before they act.

Gasoline Tank Fire

Gulf Refining Company, Port Arthur, Texas

DATE and Time of Fire—July 19, 1916, at 10:50 a. m.

Cause—Lightning.

Fire discovered by pumper and all who were within a mile of tanks.

Tanks Involved in Fire—Three; Nos. 850, 855 and 857.

Name of System—Foamite. Sold by MacAndrews & Forbes Company, Camden, N. J.

Operation—Start solution pumps and open valves in lateral leading to tank or tanks on fire. Solution flows to mixing box. Foam created and overlays on top of oil therein contained.

Pumps and Pump House—There are four foam pump houses located at advantageous points throughout the plant, each of which is equipped with one Duplex pump of 734 gallons per minute capacity, at 45 r. p. m., or 367 gallons of each solution. These pumps are each equipped with 6-inch suctions from two tanks of 25,000 gallons capacity each, one tank for each solution.

Pumper or Attendant—Regular pumper at each foam pump house at all hours. Also each division of plant under direct charge of superintendent and large corps of workmen on premises at all times.

Operation of Pumps, or Equipment—very simple. Anyone familiar with pumps can operate.

Size of Mains to Distribution System—Discharge from pump, 4 inches. Yard mains, 6 inches and 4 inches. Size of lateral from distribution main to oil tanks, 2 inches.

Foam Mixing Box—¼-inch boiler iron, 3 feet by 4 feet by 3 feet, substantially riveted together and riveted to the

Digitized by Google

side of the oil tank near top. Size of opening or orifice at mixing box, 2 inches.

Foam Solution Formula — Solution No. 1:

Foamite	3 per cent
Bicarbonate of soda	8 per cent
Water	89 per cent

Solution No. 2:

Aluminum sulphate	11 per cent
Water	89 per cent

Pressure Developed at Time of Fire—85 pounds.

Quantity of Solution (Approximate) Used on Each Tank That Was Afire—7,000 gallons on the large tank, No. 857; 4,250 gallons on tank No. 850; 3,750 gallons on tank No. 855.

This last tank, No. 855, is the one whose top was blown off and was allowed to burn for 10 minutes while they were extinguishing the fire in tank No. 857.

Thickness of the Foam—On top of tank No. 855 (the top of which was blown off), 6 inches.

Time to Extinguish Fire in Each Tank Separately—Tank No. 857, containing approximately 1,200,000 gallons of gasoline, approximately 6 minutes. Tank No. 850, containing approximately 220,000 gallons, 7 minutes. Tank No. 855, containing approximately 170,000 gallons, the top of which was blown off, approximately 11 minutes; making a total time for extinguishing the fire in the 3 tanks, operating on all of them separately, approximately 20 minutes.

Total Capacity of Tanks—

Tank No. 850	285,000 gal.	gasoline
Tank No. 855	246,000 "	"
Tank No. 857	1,415,000 "	"
Total	1,946,000 gal.	gasoline

Percentage of loss to values, one-half of 1 per cent.

Total Contents—

Tank No. 850	220,000	gallons
Tank No. 855	170,000	"
Tank No. 857	1,200,000	"
Total	1,590,000	gallons

Estimate of Number of Gallons Destroyed in the Fire in Each Tank Separately—

Tank No. 850,	approximately	1,848 gal.
Tank No. 855,	"	4,494 "
Tank No. 857,	approximately	1,680 gal.
Total		8,022 gal.

Size of Timbers Used in Roof Structures—Tank No. 850, 70 feet in diameter; center posts, 8 inches by 8 inches; ring posts, 6 inches by 6 inches; plates on ring posts, 6 inches by 10 inches; rafters, 3 inches by 8 inches by 20 feet; sheathing, 1 inch shiplap. Waterproofing tar paper placed in layers and bonded with roofing asphalt which is heavily coated with asphalt and small clam shells spread thereon.

Tank No. 855, 64 feet in diameter. Same construction as tank No. 850, with the exception that roof rafters are 18 feet in length.

Tank No. 857, 90 feet in diameter. Center posts, 8 inches by 8 inches; ring posts, two rings, 6 inches by 6 inches; plates on ring posts, 6 inches by 12 inches, rafters, 3 inches by 8 inches, by 18 feet; sheathing, 1 inch shiplap. Covered same as tank No. 850.

Size of Center Pole in Tank No. 855, Top of Which Was Blown Off by Force of Explosion—8 inches by 8 inches.

In further explanation of this system it may be said that there are 4 pump houses located at advantageous points throughout the plant and the whole premises are piped with mains as mentioned with proper cut-off valves so as to sectionalize the system, thereby using as many of the pumping plants as necessity requires. This layout is similar to the usual water system. However, the lines are above ground and are painted yellow and green so as to distinguish the two solutions, and also to distinguish them from oil lines.

All tanks, valve pits and pipe conduits on premises are fully equipped with the foam system.

In the writer's opinion the demonstration on July 19 was marvelous, taking into consideration the small amount of loss compared with the values interested. By the old pumping out method a fair average of salvage does not exceed 50 per cent to 60 per cent and in a great many instances the percentage is much less on account of the fragments of the tops of tanks falling into the contents and clogging up the suction pipes to

Digitized by Google

pumps; and even in the most fortunate instances the tank structure and equipment are total losses with the exception of the value of scrap iron. As you will see from the photographs enclosed the tanks are but slightly damaged and from the foregoing report the percentage of loss is exceedingly nominal, the heaviest loss being in Tank No. 855, the top of which was blown off and which was the last tank the fire fighters operated on.

In explanation of the manner in which this fire was managed it may be said that this is the first fire the plant has had since the foam system was installed and for fear there might be some failure in the system they concentrated their forces on Tank No. 857, which contained approximately $265,000 worth of gasoline beside the value of tank and equipment. This fire was readily put out in less time than one could tell it. They then concentrated their forces on the two smaller tanks, the last one extinguished being No. 850.

We have here a demonstration under three separate conditions.

1. Top blown off by explosion, mixing box exposed and burning wood obstructions.
2. Top partly wrecked by explosion.
3. Top intact and not disarranged.

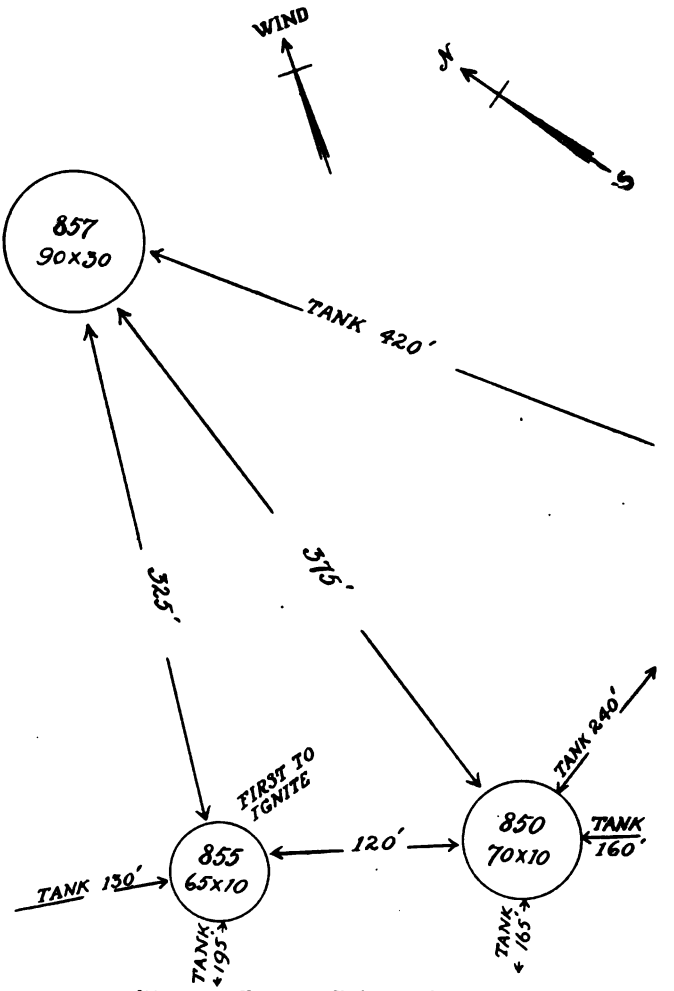


Diagram Showing Relative Location

Tank No. 1

Digitized by Google

Tank No. 2

Tank No. 3

All are steel tanks, wood type roof construction.

The top of No. 855 had blown up at least 10 feet and precipitated in pieces into the tank, leaving the center pole sticking up above the top and the rafters heading into the tank, as the picture tells. Top of Tank No. 850 was not damaged to any great extent, the fire burning around the edge or eaves of the roof and put out with the top intact; while in the large tank, No. 857, there was a minor explosion which buckled the roof and made an opening of approximately 10 by 20 feet. Therefore, we have a demonstration of three classes of steel tanks with wood tops—one with the top blown up and falling into the tank, the rafters and metal retarding the action of the foam; the other with the top partly blown off, and the last with the top intact.

As indicated by the report all three tanks were not filled to their capacity, thereby leaving space between the fluid and the top for gas accumulation, which was enormous.

In Tank No. 855 the roof rafters not only materially retarded the action of the foam, which eventually crept around these obstructions, but naturally were burning above the gasoline line after the gas was entirely cut off by the envelope of foam. The center pole was left burning in order that the manager might get a clear conception of what the result would be when this large piece of burning wood fell into the tank. The foam worked to his perfect satisfaction, as when this burning post fell into the tank, parting the foam, a volume of fire immediately shot up through this opening in the foam, but in less than one minute the foam reunited and the fire was entirely extinguished. In putting out the rafters and roof structure fire in this tank one stream of water was used from a 2½-inch hose line of about 125 pounds pressure through 1⅛-inch nozzle. Even this volume of water did not materially deplete the value of the foam

Digitized by Google

as might be expected.

Action of Mixing Box —It had been the opinion of the writer, as well as of other parties with whom the matter was previously discussed, that the mixing box would be put out of commission in case of an explosion in the tank, and much to the satisfaction of those interested, that was not the case in either Tank No. 855, top of which was blown off and dropped back into the tank, or in Tank No. 857, in which occurred one or two minor explosions.

Tank No. 4

The accompanying pictures, which were taken within an hour after the lightning ignited the first tank, and diagram showing relative location of tanks and wind direction at time of fire, will no doubt prove interesting.

N. B.—On August 7, at 6:30 p. m., lightning ignited a 55,000-barrel, steel, wood top tank containing 50,000 barrels of refined kerosene. That fire was extinguished in about 30 minutes. Loss to tank and contents, less than $500. About the same time 3 tanks of crude oil located about 6 miles north of the Gulf Refining Company's plant were ignited by lightning. Not being protected, tanks and contents reported as total loss. Loss estimated at $200,000.

Ammonia Explosion

Bureau of Surveys, New York Board of Fire Underwriters

ST. GEORGE HOTEL, Brooklyn, August 6.

The refrigerating plant in which this explosion occurred was located in the basement of the 10-story brick building at 51 Clark street, about 30 feet back of the building line. It was installed about 10 years ago by the Steel & Conduit Company of Jersey City, and had given satisfactory service in the interim. It was of the absorption type, of 10 tons capacity.

At the time of the explosion it was in charge of the night engineer, who had been employed there for about two months and had not previously handled refrigerating machinery. At about 4:00 a. m. he was having trouble with the pump furnishing the water supply to the ammonia condenser, and consequently the generator pressure was rising and had reached 200 pounds when he telephoned to, and received instructions from the chief engineer as to what to do. He was apparently too excited to carry out these instructions. An attempt was made to change to another set of pumps, but in the excitement the discharge valve was left closed and no water delivered to the condensers. The pressure had mounted to 250 pounds and escaping ammonia made the engine room untenable and the engineer, after closing several valves, left the engine room and was on the stairs when an explosion, which sounded to the clerk in the office above, as a "big puff," occurred.

The explosion resulted from the failure of the head of the condenser, due to excessive pressure. The condenser was a cast iron cylinder of metal about

Digitized by Google

2¼ inches thick, with heads of similar thickness, bolted on by through bolts. The failure was by the breaking through of the head approximately on a line with the inside surface of the cylinder, except on one side the flange was broken across. The head was found only a few feet from the shell of the generator.

An examination of the valves immediately after the room became tenable showed the following conditions. The valve from the generator to the condenser was shut. The steam was shut off from the coils in the generator. The weak liquor return from the generator to the absorber was shut. The pump delivering aqua ammonia from the absorber to the generator was running. The result was that all outlets of the condenser being closed and the pump still running, the head was simply pushed out of the generator by the hydrostatic pressure developed.

There was no relief valve on the apparatus. There was no external explosion of fire, although there was an open gas flame to light the gauges.

The explosion or break did no damage other than blowing the doors of the engine room from their hinges and the damage to the refrigerating plant itself. The escaping ammonia found its way up through the hotel, however, and caused considerable confusion and alarm among the hotel guests, many of whom were affected by the ammonia fumes although only two to such an extent that they had to be removed to the hospital.

CONCLUSIONS

Every refrigerating plant should be equipped with a safety valve to guard against excessive pressure. It is also advisable to have some form of an automatic cut-out to stop compressor or pump if the pressure runs too high. Refrigerating plants in places of public assembly should preferably be located under sidewalk or courts with outside ventilation and cut off by substantial fire walls and fire doors, tight fitting, from the building proper.

Health Conservation at Steel Mills

Advice of Value to Thirty Million Workers

THE United States Bureau of Mines, Department of the Interior, which has in the past been mainly interested in the reduction of deaths by accidents among men connected with the mining industries, has broadened its scope to include the health of the men and has just issued a report on health conservation at steel mills. This report, while especially prepared for the benefit of the men who toil in the great steel mills, contains advice of direct value to everyone of the 30,000,000 workers in the United States and also to all employers of labor.

The issuance of this report is directly due to a co-operative agreement entered into by Director Van H. Manning of the Bureau of Mines with the Public Health Service, the latter service assigning Surgeon J. A. Watkins to the task.

"The importance of the prevention of disease among workers can be realized from the fact that the average loss of time due to illness among approximately 30,000,000 workers in the United States is 9 days a year," says Surgeon Watkins. "If medical attention be estimated at $1 a day and earnings at $2 a day this loss amounts to nearly $880,000,000 annually.

"The statement that a man whose health is below par has a working efficiency below par should need no explanation. Efficiency of the workman is a subject no operator can afford to ignore, for, after all, industrial efficiency depends on the man behind the machine. Aside then from its humanitarian aspects, the prevention of conditions productive of ill health is a plain business proposition.

"Health is the workingman's capital, his stock in trade. Without health his earning capacity is limited, and those dependent on him suffer as well as he. The workingman has a right to demand that he be not required to work beside men

Digitized by Google

who are diseased or mentally deranged. All candidates for employment and all men already employed should be examined in order that those physically or mentally defective may be detected and given medical attention. Moreover, a system of medical supervision is necessary in order to prevent the introduction and spread of infectious or contagious diseases. Experienced, hard-working and valuable employes may not be working at their full capacity because of some defect of which they are unaware. Should such conditions be brought to light and remedied, these men will be restored to full efficiency.

"Again, a progressive disease may be affecting a person, so that his working period is being rapidly shortened. With a system of physical examination his condition is discovered, treatment is instituted at an earlier date and relief made more certain.

"In the past it has been customary for the attending physician of an industrial plant to confine his activities to the treatment of those injured or taken acutely ill while at work and to give only a part of his time to these duties. The physician should be a whole-time employe and his expert knowledge and training along other lines should be utilized. His duties should include medical examination and supervision of the health of the working force.

"Another important duty that a company may take up is that of personal hygiene. Employes of experience and skill whose services are of value may be living in such unhygienic surroundings that their period of service is being rapidly cut short. By encouragement and advice the condition can be corrected and sickness in the family prevented.

"Undue fatigue is one of the most common causes of occupational disability; it lowers the vitality of the individual and thereby increases his susceptibility to the hazards of his occupation and to disease in general. Fatigue is also of direct practical importance. It lengthens the time necessary for the worker to perform a given amount of work, thereby decreasing the amount of work performed in a given length of time, as, for instance, a working day. In addition, it increases the liability of error and is an important causative factor of accidents."

Near Accidents

Safety Bulletin, Illinois Steel Company

A LATHE hand, at the Joliet works, was filing a piece of steel in a lathe. He had his sleeve rolled up but it came loose and the end of the cuff caught on the steel. His clothing was torn from him and it was only a miracle that he wasn't drawn against the lathe, and badly injured. This should prove as a warning to every one as hundreds of men have been killed and seriously injured in this manner. Just remember—Don't wear loose clothing while working about machinery.

SAFETY RAILING SAVES A LIFE

While a workman was helping a pipe fitter repair a pipe line, over some saturators at the coke plant, he became weak, due to too much gas. He started to get to some fresh air but when he got to steps leading to the ground floor he fainted and fell against the railing of the steps. Workmen went to his rescue and he was soon revived.

This railing no doubt saved his life. If it hadn't been there he would have fallen to the ground floor of the still room, at least 20 feet.

GOGGLES PREVENT BLINDNESS

A millwright helper was pouring some babbitt into a bearing when the babbitt splashed and struck the goggles he was wearing. The goggles were covered with babbitt and they alone saved the workman's eyesight.

We presume this man will continue to be wise and wear goggles for his own interest and that of his family. As for us, "Why should we await such an object lesson?" Let's profit by his narrow escape and not take any chances. "Wear Goggles."

Digitized by Google

Lord Lister and Clean Wounds

By T. J. MacMahon

American Car & Foundry Company, Detroit

THE life, labors and discoveries of Lord Lister, the most celebrated of Scotland's famous surgeons, were very closely related to three methods of treating wounds, either accidental wounds or surgical wounds (incisions made by lancets). (Physiologically there is no difference between the two classes of wounds.) The three methods may be briefly but accurately distinguished by the three words—

SUPPURATION, ANTISEPTIC, ASEPTIC.

Until quite recently—within the recollection of many of us—the first method, suppuration—which is intense inflammation accompanied by the formation of pus and intolerable pain—was the accepted theory and practice of the medical profession for the healing of all wounds. "That was Nature's way," it was argued by physicians and surgeons; the more pus and inflammation the better; it indicated a healthy wound!

But in the year 1869 Professor Lister announced that this theory was all wrong, and practice based upon it was equally so. He declared that antiseptic surgery was the better way and more nearly Nature's way as well, that is, wound-healing and surgery with inflammation reduced to a minimum. He achieved this by his discovery and invention of iodoform, a powerful drug of intense antiseptic qualities. By its use all infected wounds were more quickly healed, and with fewer complications (as blood poison, etc.). Pain was reduced in intensity and duration and best of all—deaths from wounds and surgical operations were reduced by 55 per cent —more than half. A great triumph for antiseptic surgery!

Fifteen years later—in 1884—Professor, now Lord, Lister made a further discovery and a greater advance. He proclaimed that while antiseptic surgery was better, aseptic surgery was best of all. That is, surgery and wound-healing absolutely devoid of any suppuration, or pus. He had in the meantime "discovered" and demonstrated that most infections in wounds (and surgical incisions as well) were caused by germs (following the vital teaching of Pasteur on that subject). He affirmed that if wounds and surgical instruments, doctors' and surgeons' hands, nurses' garments, and the very air itself in the operating theater were all carefully and completely sterilized, from the very beginning, no germs could enter the wounds or incisions made by the surgeons' lancets. Therefore no inflammation could be started, no suppuration would result, no pus would form, and wounds would heal by "first intention" minus all complications! Lord Lister and other eminent surgeons at Edinburgh demonstrated this theory again and again. It is now the A B C of surgical science and is the accepted theory and practice of every physician and surgeon of repute.

This great benefactor of the race then proceeded to prove that all wounds—great and small—could be as completely sterilized as the surgical instruments, that there was absolutely no reason why any wound should become infected with germs to set up inflammation. This beneficent theory was actually applied in victorious practice at the Royal Hospital in Edinburgh and is now everywhere adopted and scrupulously followed.

It is most gratifying to read that while antiseptic surgery reduced the death rate by 55 per cent, aseptic surgery further reduced it by 25 per cent, so that where, in former years, 100 persons died of wounds and their infections, only 19 persons die now. The ultimate logic of this surgical practice is

KEEP OUT THE GERMS

This can be done. If you are wounded in this plant—*immediately—at once—without a moment's delay,* report to our

Digitized by Google

doctor for instant treatment. That is his professed work. He is as skillful at that as you are at your job. The doctor will at once:

1. Absolutely remove or destroy the infecting germ before it can begin its work of inflammation.
2. He will render—especially in eye injuries—suppuration almost impossible.
3. He will reduce your pain to a minimum or abolish it entirely.
4. He will in most cases save you many hours of lost time, and often many days' lost time.
5. He can and will specially treat your injured eyes. They are the most delicate and most precious of your organs. Give the doctor his best chance to save them, if they are injured ever so slightly.

During a recent month there were many accidents caused by the men's own carelessness. Many accidents were increased in danger and severity with much needless pain added, because the sufferers did not report to the doctor at once. They lost time and suffered unnecessary pain in consequence.

Do not repeat this folly in your own case, nor let the other fellow do it either.

Go to the doctor at once when injured, no matter how slightly. His services are free to you.

If through lack of attention to "Safety First" or from any other cause, you *must* have wounds,

LET THEM BE CLEAN WOUNDS

That is why the Supreme Inventor gave us Professor Lister.

Building Safer Schoolhouses

AT the ninth congress of the American School Hygiene Association, held in New York in July, at the Russell Sage Foundation, Frank Irving Cooper, a Boston architect, gave an address on "Safety in Schoolhouses." Mr. Cooper's audience was composed almost entirely of persons who are in some way related to the building or the care of schoolhouses, and he set forth the vital principles of the prevention of fire risk. He told of one high school for which he was the architect where fire-stop and smoke-stop doors were planned, and then omitted by direct order of the school authorities. The objection of some school authorities to such doors is that they seem to interfere somewhat with proper discipline.

Mr. Cooper's plea for safe schoolhouses included these principles:

Stairways should be absolutely fireproof in their construction, and then enclosed within fire-resisting walls.

From each floor the stair well should be entered through self-closing doors which must never be fastened open.

The stairway should be the factor of safety in a schoolhouse and should be in one series from bottom to top, for it is bad planning if the pupils must leave one stairway for another somewhere else.

The steps should be well proportioned and not too steep.

If the stairway is more than four feet wide, there should be a hand rail in the middle besides those on the walls.

If the school building is large, there should be a fire wall dividing it, with the openings protected by fire doors. Children can be moved more quickly through such a door than they can down stairways.

With reference to fire escapes, Mr. Cooper voiced some important principles:

Ladder escapes should not be used on a school building.

Outside stairways should not, unless unavoidable, pass across a window. If they must do this, this window should be set with wired glass, set in metal frame.

To give access to such stairs a door of at least 30 inches in width should be cut through the wall.

The platform of the escape and the floor should be on the same level.

The door should not obstruct the passage when open, and it should be fitted with a panic bolt.

The pitch of the stairs should be the

Digitized by Google

same as for the inside stairs so that the children under excitement shall encounter no strange conditions.

Winding fire escapes should never be permitted on schoolhouses.

Mr. Cooper referred to the increasing use of elevators in schoolhouses, and outlined some safety requirements here.

The speaker urged measures looking toward uniform standards in schoolhouses, so that it shall be possible for schoolhouse commissions to have facts for their basis drawn from the experience of others.

"Then," said Mr. Cooper in conclusion, "the building of a new schoolhouse in a community will no longer be in every instance a costly experiment."

Accidents at Railroad Stations

MANY persons, in traveling, persistently violate not only the rules of the railroad, but also the principles of common sense, says the Engineering and Inspection Division of the Travelers Insurance Company, and any man employed in a busy railroad station can tell of many wholly needless tragedies, of a still larger number of narrow escapes, and of thousands of foolhardy actions on the part of travelers. In the hope of leading some of these unwise individuals to see themselves as the railroad men see them, we are going to call attention to a few of the things they do.

A business man, finding it necessary to go out of town, will often allow no more than the ten or twenty minutes required to travel from his office to the railroad station under ordinarily favorable conditions, even though he must know that any number of things may interfere with his schedule. He may have to wait a minute or two for the office elevator, the street car may not appear on time, or the taxicab may be late in arriving, and still other delays due to traffic regulations or blockades may be encountered. Arriving at the station he may find several other persons ahead of him at the ticket office, thus causing him further delay; but he finally manages to buy his ticket, and with but a few seconds remaining before the train is due to start, he dashes for the platform, only to find the train under way. Having overcome the various obstacles in the preliminary steps of his journey, however, he is in no mood to be balked by the fact that the train is in motion. He therefore attempts to board it at the nearest available point, without regard to the location of the car in the train. If it is the last car and he makes a misstep or misses the handhold, he may fall, become mussed up, and look and feel foolish—and perhaps he will also receive a minor injury. But the same mishap at the middle of the train may end in serious injury or death.

This simple word-picture will be recognized by everybody, for we have all seen the man doing the thing. The circumstances preceding the climax may be of infinite variety, but they inevitably lead up to the possibility of an accident. In another variation of the theme, a passenger may alight from a train to meet and converse with a friend. The actual starting of the train is commonly the first warning that he heeds, and he must then run to board the moving train, or be left behind.

Many persons appear to feel that they must not wait until the train stops before alighting. The proper operation of vestibuled trains automatically prevents accidents from this cause, but the use of vestibuled trains is not practicable at all times, particularly in commutation areas, and there are hundreds of trains in operation every day with no protection on the car platforms except the ordinary swinging iron gates, which any sophisticated passenger can open. Thus, notwithstanding the fact that every car bears a notice warning passengers against riding on the car platform or steps, and perhaps against alighting before the cars stop, we see trains coming into stations every day with the platforms and steps crowded; and as soon as the train slows down to a point where

Digitized by Google

a passenger thinks he can save time by running, he will jump off. The jumping habit is most strongly marked, perhaps, when there is a grade crossing just before the station is reached. The men whose route lies along the road or street that is crossed often jump off in squads at a point like this, being apparently quite willing to risk their arms, legs and necks for the sake of saving a few steps, or three-quarters of a minute of time.

The accident that too often follows may come about in various ways. The jumper may trip as he leaves the steps, or he may land awkwardly, or he may miscalculate speed or distance. Again, one person may jump from the rear steps of a car at the same time that another one jumps from the front steps of the next following car, and the two may collide so that one of them will be thrown against the moving train, or under it. Many accidents also occur to jumpers from colliding with trucks or piles of baggage, or with the pillars supporting train sheds of the "umbrella" type. None of these hazards are imaginary or "theoretical." They are very real and practical, and deaths and serious injuries are occurring, every day, in consequence of them.

Another common and unwise habit, especially marked among commuters, consists in walking through the cars toward the front end of a train as the train approaches a station. The object, of course, is to save time by getting as near as possible to the station exits before the train stops. When the track is straight at the station, there is no great danger in this practice, but it often happens that a curve is rounded just before the station is entered, or that the train must be switched across other tracks in order to approach the platform properly. A train swerves more sharply when taking a switch or a series of switches than it usually does while on the open right-of-way, and passengers going from one car to another as the train strikes a curve or a switch are exposed to the danger of being hurled from the platform. At best, the time gained by crowding forward is less than a minute, and this small gain is often lost because of the greater crowds in the forward cars, and the consequent delay in alighting.

Enginemen and station men must keep a sharp lookout for passengers standing along the platform awaiting the arrival of a train. Many travelers, through carelessness or indifference, habitually stand too close to the edge of the platform, and every year the statistical records show a certain number of persons killed, and a greater number injured, from being hit by locomotives or trains approaching stations. Nor is the danger from this source limited to persons who stand too near the track. It extends to those who, while going from one section of the platform to another, pass between the moving train and a post, baggage truck, or stairway. We recall a recent case in which a station attendant called out, as usual, that the Pullman cars of an approaching train were at the front end, and the day coaches at the rear. This announcement caused two men to start walking in opposite directions, and they met at a point where a post supported the train shed. Other travelers crowded the platform, and one of the men, to avoid them, swung quickly between the post and the train. His traveling bag struck one of the steps, and the impact threw him between the cars, where he was instantly killed.

Gray hairs are added to the average stationmaster's head by the man who walks close to a moving train and at the same time cranes his neck in an effort to locate a friend—perhaps standing on tiptoe in order to obtain a better view. A man of this type appears to be perfectly oblivious of the fact that he is within an inch or two of serious danger. Some railroads have tried to reduce this hazard by painting a "dead line" the entire length of the station platform, with signs at frequent intervals warning passengers to keep behind it. This is a good idea and it should be adopted more generally, although a good many travelers pay but scant attention to things of this kind.

Digitized by Google

Safety Work in Gas and Electrical Industries

Special Problems of Public Service Companies to Protect Their Employes and the Public

Safety Device for Large Transformers

By H. E. Bliss

THE accompanying illustrations show the adaptation of a periscope as a safety device in reading the temperatures of transformers. In Fig. 1 will be seen the ordinary location of a thermometer on the side of the transformer. It will also be noted that it is located near the top of the transformer

Fig. 1

Fig. 2

Digitized by Google

Fig. 3

Fig. 4

and not far from the high tension terminals. The periscope is installed on the transformer in position ready for use.

Fig. 2 shows the ordinary position of an employe when reading the temperature on the thermometer. A ladder is generally recognized as a dangerous piece of equipment, and that an employe must climb up near high tension terminals has always been considered as more or less of a hazard.

Fig. 3 shows the periscope in operation. The employe is taking the reading while remaining on the floor in an entirely safe position.

Fig. 4 proves the efficiency of the periscope. It will be noted that the reading is perfectly plain and that the device is entirely satisfactory in the service for which it is intended.

In view of the comparative cheapness of the installation and the measure of safety it provides for those who must read the temperatures on this type of transformer, it would seem that the periscope offers a decided protection and might be termed an "A-1" accident prevention idea.

Note by the Editor of Safety Engineering: Mr. Bliss has been actively engaged for more than twenty years in positions which call for the care of large transformers. He has probably had a larger experience in taking the temperatures of transformers than any other man in the country. The apparatus described in this article has been used for some time in a large plant and has demonstrated its efficiency in accident prevention.

Digitized by Google

Fire Prevention "Don'ts" in Use of Gas

By the Consolidated Gas Company, New York.

LIGHTING—Don't use open flame burners; they are expensive. Mantle lights will give you more and better light and use less gas.

Don't use lamps and mantles or fixtures that are too cheap; they are more expensive in the long run.

Don't continue to use broken mantles or broken glassware—replace with new.

Don't use mantle lights without glassware—where the glare may hurt the eyes.

Don't handle mantles roughly—they are fragile and easily broken if treated carelessly.

Don't light mantle lights by poking matches through the holes in the glassware; light at the opening at top.

Don't allow pilot to remain out—give it more gas by opening pilot screw and relight.

Don't forget to turn out lamp when through using it.

Don't hang curtains where they can blow over the gas light.

Don't use the gas fixture to hang clothes or anything else on.

Don't let a lighted burner on a swing bracket be pushed back near a curtain or near any combustible material.

Don't try to repair a gas leak in a fixture yourself; if you think there is one, send for a plumber or notify the gas company.

Don't hesitate to call up your gas company when you want any advice or help.

COOKING

Don't leave your range burners burning when you are not using them; it costs money.

Don't let the flames lick up around the outside of a vessel or pot; turn the flame down to the proper height and save money.

Don't allow the range to become dirty and do not let dirt or rubbish collect underneath or around it.

Don't let children play around the range or touch the burners or cocks.

Don't let your range or hot plate be set right against or too close to a wooden wall or partition.

Don't fail to turn off and relight a burner that has flashed back. This condition is indicated by a roaring sound and a yellow flame.

Don't hang clothes over the range to dry.

Don't lean over the lighted top burners of a gas range; you might set fire to your garments in this way.

Don't hang curtains where they can be blown over the burners and set on fire.

Don't use flimsy covers or hangings on shelves that are directly above your range; better still, avoid the use of shelves above the range where possible.

Don't use the space between the range and the wall as a place to store brooms, clothes, etc.

Don't forget to open oven door before lighting oven burners.

Don't turn on gas until you have a match ready.

Don't leave gas turned on while looking for another match.

Don't turn off pilot light before the oven burners have lighted.

Don't close oven door until you are sure that the oven burners are lighted.

Don't turn the burners too low.

Don't turn up burners after they have been turned down without first looking to see that they are lighted.

Don't look for a leak with a lighted match or any other open flame.

Don't hesitate to call up your gas company when you need advice or help.

GENERAL

Don't use the cheapest tubing for connecting portable lamps, heaters, or other appliances. The best grade is the most economical in the long run.

Don't forget to turn off your gas iron when through using it.

Don't allow dirt or rubbish to collect under your room heaters or stove.

Don't hang clothing over your room heater or radiator in order to dry it.

Don't let your room heater be placed

Digitized by Google

too near wooden partitions or other combustible material.

Don't forget to turn off the gas at the fixture when through with appliances which are connected by flexible tubing.

Don't let your water heater burn any longer than is necessary to heat the water needed.

Don't attempt to light an automatic instantaneous water heater without first carefully turning off the main gas cock.

Don't hesitate to call up your gas company when you need advice or help.

Don't ever search for a gas leak with a lighted match or other open flame, and don't hesitate to call your gas company when you want advice or help. Its desire is to serve you efficiently and promptly in all matters pertaining to the use of gas.

Typical Accidents Among Public Service Employes

Bureau of Safety, Chicago

WRENCH CAUSES SERIOUS FALL—The Cause: The injured was working on a platform 12 feet above the concrete floor. He was using a wrench which had not been properly adjusted to the nut on which he was working. The wrench slipped, causing him to fall to the floor below. The Result: Serious injuries to the back. The Remedy: See that the wrenches are in good condition; that they are not sprung and that they are properly adjusted. When using set wrenches be sure to use a wrench which will fit the nut.

FALL FROM A LADDER BREAKS ARM—The Cause: The injured was coming down the ladder with a large pipe wrench in one hand. The handle of the wrench caught on the rung of the ladder which caused the man to fall. The Result: Broken arm. The Remedy: Always have the free use of both hands when going up or down a ladder. Use a hand line to raise or lower tools or material which cannot be carried in the belt or pocket.

TREE TRIMMING FATAL—The Cause: The injured when working on a ladder sawed off a heavy limb of a tree. The limb rebounded; the butt of it struck the man and knocked him off the ladder eighteen feet to the ground. The Result: Fatal. The Remedy: When cutting down trees or cutting off heavy limbs use hand lines to guide the tree or limb to the ground.

LEATHER GLOVES NOT SUFFICIENT PROTECTION—The Cause: The lineman had some material to take from the storeroom and forgot to take his rubber gloves. When he started work, rather than return for his rubber gloves, he attempted to handle a 2,300-volt circuit with leather gloves. The Result: Fatal. The Remedy: Under no circumstances attempt to handle a live circuit without rubber gloves. A few minutes' time spent going after the gloves would have saved this man's life.

MOTORMAN'S UNSAFE PRACTICE RESULTS SERIOUSLY—The Cause: Three cars were running as a train to a point where the rear car, a motor, was to be detached. The motorman of the rear car leaned out of the left front door and attempted to uncouple his car before the train stopped. He was caught between his car and a car passing in the opposite direction. The Result: Body badly crushed about the hips. The Remedy: Do not attempt to uncouple cars or do any work of this nature until the cars have come to a stop.

FALLING WRENCH STRIKES WORKMAN—The Cause: The workman left a heavy wrench on a pipe which was vibrating while he went for some material. The vibration caused the wrench to fall and to strike another workman below. The Result: Serious scalp wound. The Remedy: Never leave any tools or material in an elevated position from which they may fall by vibration or wind or from which they may be knocked by another workman.

Digitized by Google

EDITORIAL

Professional Economy

A GREAT many small plant owners seem to be laboring under the delusion that they are too small to do any safety work among their employes, because they cannot show figures on costs and accomplishments to compare in size with the employer of thousands; but they have a better opportunity to show the proper ratio between these figures than the employer with the large payroll.

The effectiveness of accident prevention work or safety engineering depends more on quality of service than on quantity, and this is the factor of great importance, which needs serious consideration by the employer who feels that his payroll is too small to economically carry a safety engineer. Too many assume that the hazards existing and the risk involved are of such natures that some handy man with spare time can handle the work. That might be true if the handy man had the proper qualifications, but the first essential of successful hazard elimination is knowledge—knowledge of accidents, knowledge of hazards, knowledge of the principles of safety engineering and knowledge of application of the principles to one's own needs. In knowledge of the principles and their application is where many fall short. Their work shows they need more training. They admit it. They say, "Next time we will do it differently." But they continue to experiment. They try the same experiments that safety engineers have tried. They duplicate work which is entirely unnecessary. By so doing they contradict the principles of safety and efficiency, until they realize that the best would have been the cheapest. How long will it take employers to learn that lesson? How long will it take them to realize that the safety engineering profession offers economies which are adaptable to large and small plants alike?

Experience is a good teacher but an expensive one. The safety engineering profession has better teachers and cheaper ones—engineers who have paid the high cost of experience themselves and who offer their services at a small fraction of that cost to far-sighted employers who have learned the other lesson. That "the best is cheapest in the end" applies to safety engineering as well as to all other professions.

Fifth Annual Safety Congress

THE Fifth Annual Congress of the National Safety Council to be held at the Hotel Statler, Detroit, commencing October 17, promises to be a far more important and comprehensive convention than any previous one. There has been added this year an exhibit of safety devices and appliances under the auspices of the National Safety Council. Thus those in attendance at the convention will have the opportunity of attending not only the important sessions and discussions, but also the additional opportunity of inspecting the comprehensive exhibit of appliances used in industry for safeguarding life and property. The Annual Congress of the National Safety Council is undoubtedly the most important gathering of its kind in this country, during the year. The program indicates instructive sessions.

Digitized by Google

Construction of Tanks in England and America

THE difference in engineering practices in this and European countries is indicated by the accompanying pictures. Fig. 1 shows a wrought iron tank with a capacity of 1,000,000 gallons, measuring 60 feet in diameter and 50 feet in height, as constructed by the Sharon Plate Works, and erected at Cortland, N. Y. Fig. 2, on the other hand, indicates a tank recently constructed at Swinton, near Sheffield, Eng., where cast iron was used exclusively. This tank has a capacity of 49,000 gallons. Its dimensions are 33 feet square by 7 feet 6 inches deep. Figs. 3, 4 and 5 indicate how the panels are supported by tie rods with turn buckles.

From the standpoint of American engineering practice it is hard to conceive how construction of that nature can be considered advantageous from an economic or from a safety standpoint.

In the United States, this form of tank construction has never appealed to the designing engineers, the circular plate construction, Fig. 1, being the usual form.

Fig. 1.

Fig. 2.

Fig. 3

Digitized by Google

Fig. 4.

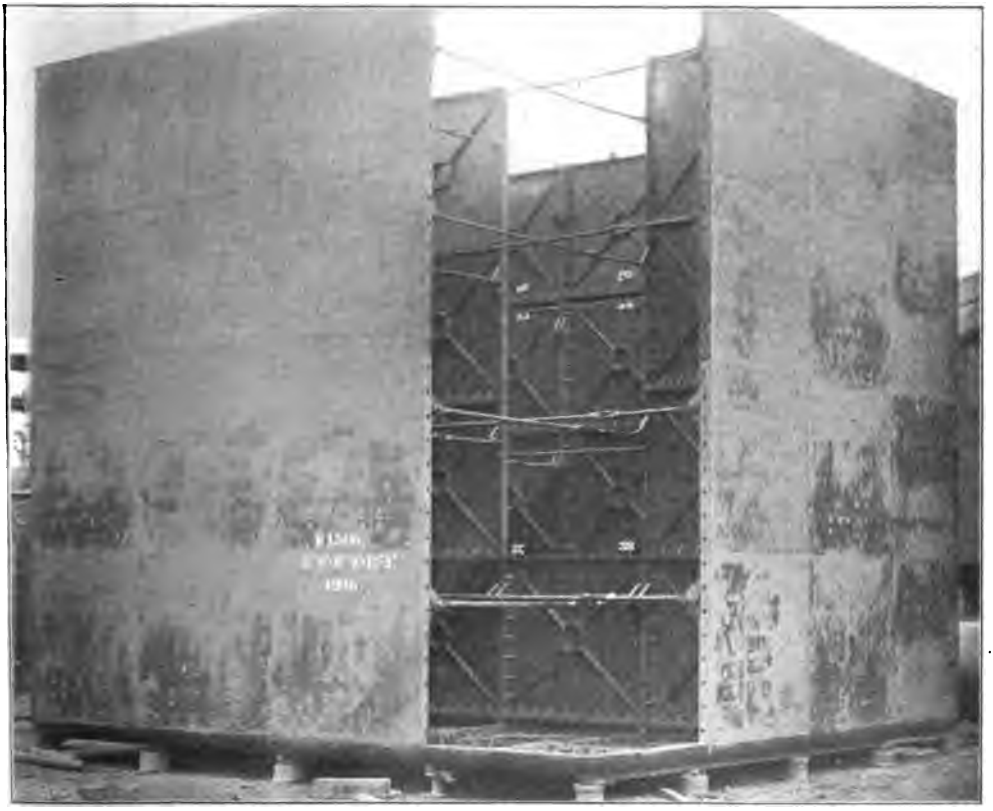


Fig. 5.

Digitized by Google

Who Will Bell the Cat?

By C. E. Worthington

This is a tale of the Is and not of the Ought To Be. And because they are not the same is the excuse for the tale, for when the Is and Ought To Be fall together then will be at hand the long looked for Millennium; and the ways of the world will be turned from the altars of Mammon to the love of all mankind; and the common good will be the first thought.

WHAT part of this story is true, and the reader must judge for himself as to that, actually happened in Cesky Obchod. To be sure that is not the name on the map and you might search the whole State of New Rhodeshire and not find it, but the name is correct enough, as indeed it is for more than one factory village.

There were 80 men to be housed, fed and warmed; something that required a house where there was no house—a sizable house with 40 sleeping rooms, besides lounging rooms and kitchen. So a house must be built and building a house of that size, thanks to the "high cost of living" and the War, is an undertaking to make almost any sort of a pocketbook groan aloud (the fatter the pocketbook the louder the groans).

The president sent for his architect and told him what was desired, explaining that the company had earned only 26 per cent the year previous and but little more this year and was consequently on the verge of poverty, not to say brankruptcy. Nevertheless the house must be built and at the lowest possible cost.

Maybe this architect is not one of the shining lights of the profession. Possibly you might not recognize the name if it were mentioned, but he is a good architect as far as personal knowledge of his art is concerned and well versed in what is good or bad construction.

But he is a young architect with none too much business (a condition not uncommon with young architects of great ability) and he has a family to support, and not only is the president his best and most profitable client, but the fact that the president employs him brings many other clients.

There is no State building law in New Rhodeshire and no local law in Cesky Obchod. It is go as you please and go the limit, which latter was the order.

The architect could not afford to anger his best patron. His income would not bear the sacrifice, and the plans were drawn—possibly with a secret hope that someone would interpose at some stage some barrier to the erection in conformity with them, thus relieving his conscience and the situation simultaneously.

"Cheap" was the order, so the big house was planned: Wood, two stories and basement, with 2 x 10-inch joists to 16 inches on centers with open bridging carried on 4 x 6 inch girts, the whole to be sheathed in varnished wood inside. Open halls the full length in each story with two open stairways (one near each end) 3 feet wide from basement to top. It was to be steam heated, and the small room for the heater would have wood finish, floor, sides and ceiling, a chimney with 4-inch walls, unlined, with a single flue to receive the waste heat and smoke of both the heater and the kitchen range. The partitions were all of hollow wood. Not a fire stop nor even solid bridging anywhere. The order was fully complied with—"the cheapest possible."

The plans went out to the contractor who usually did the president's work.

His business is also his living, and the president is too good a customer to offend. Yet his conscience forbade his acceptance of this job, or at least strove to forbid it. He shuddered to think of the possible (almost probable) results of housing 80 men in a tinder box from which, in case of fire, the escape of all would be practically impossible and also of his responsibility in the event of such disaster. What course could he pursue?

There are *no* authorities with power to regulate or forbid such things in the

Digitized by Google

State. Whenever such legislation is proposed the presidents stir themselves and interview the legislators, expressing their views in such an effective way that even if a bill is prepared it usually dies in committee. Sometimes they use other means. Do some doubts possess you? If so attend a "public hearing" of a legislative body concerning some such measure, or almost any measure, looking to the betterment of fire hazards and housing conditions. You can learn much.

You will perhaps come away enlightened, having learned the fireproof character of wooden shingles, the needlessness of fire stops, fire walls and all of the other unreasonable, unnecessary and expensive restrictions that fanatics and theorists who seek to undermine the prosperity of the country are seeking to impose upon suffering landlords.

Maybe you will doubt these things, but there are some things you cannot doubt. The average legislator is loyal to his job, not infrequently, from a legislative point of view, the desires of the larger property owners pass current for public opinion, campaigns cost money and only those who have money and plan to get more of it can afford to contribute freely, and after all it is not well "to bite the hand that feeds you," for which view not only the proverb, but a hundred quotations from Scripture can be adduced.

There is no bribery here, merely ordinary human nature, and some of the best instincts of that, so slightly perverted that one may not say exactly where the perversion begins.

Should the contractor pass it up to some insurance expert or inspector hoping for condemnation? The president's business means large commissions and if not a customer he may be at some future time if carefully dealt with. Besides all the presidents hang together in such matters. What can the inspector do? To criticise or condemn is to incur reproof or even dismissal for offending the president, and through him all other presidents and directors. He is in a dilemma, to be met only by some stifling of conscience and an adroit evasion, neither approving nor condemning, simply passing it along to the insurance rating board. Their business is to make prices for things as they find them; that involves them in controversies enough without seeking more.

So the house is built. A flimsy fire trap with open flues of wood ramifying walls and floors, inadequate chimney and inadequate stairs, combustible varnish, wooden furnace room, and no fire apparatus nor escape. Into it are crowded 80 men and their attendants. Nearly 100 souls!

And the fire comes, in the night when men are asleep. We know most persons roused from sound sleep are dazed and helpless, unable to think for a minute or more, and a single minute is an age in the progress of a fire. Some escape unhurt; some are injured and a dozen or more are removed in charred fragments.

Who is responsible—the State, the town, the owner, the architect, the contractor or the inspector? It is easy to moralize, but the president is the servant of his stockholders and directors. Stockholders and directors are not in touch with details; they expect dividends (and occasional "melons") which they receive with thankfulness and little inquiry as to how they were produced. They cannot well act together, and separately they can do nothing, while from the president downward each man is simply "protecting his job."

It is easy, very easy to condemn such erection in the abstract. But in the abstract—well, review the case, noting the chances for effective action at each stage and the reasons for inaction, and say where the blame lies. All towns are not duplicates of Cesky Obchod nor all States of New Rhodeshire. Neither do all presidents set dividends above humanity, and to none of these does this tale apply, since fortunately there are many exceptions, and shining examples are by no means lacking of repudiation of this precise phase of "Americanism" which has done so much to bring us as a people under the condemnation of older and wiser nations.

Law at best is a poor substitute for conscience, and no law not sustained fully by public conscience and in accord with it can be effectively enforced. We cannot make bad morals good by act of

Digitized by Google

the legislature. The best laws we have been able to make so far seem somewhat liable to evasion or perversion by "malefactors of great wealth," but on the whole a good law even if imperfect still may set a standard in advance of public thought which the public can be educated up to in time and the process by enacting new laws a little further in advance repeated. *All* New Rhodeshires should have building laws and all Cesky Obchods likewise, that is clearly the "Ought To Be" but not the "Is."

Perhaps our civilization is at fault and of too high a grade. Prescott in his "Conquest of Mexico" adduces the fact that the Aztec laws bore chiefly upon the protection of the individual in his personal rights and safety rather than the protection of property as evidence of the low order of their civilization.

Be that as it may, it is more in accord with the awakening modern spirit to hold that the real good of the average individual is the good of the community, not the endowment of the few. That which looks to universal betterment is best in the long run. The real task is to create a public conscience and induce the majority to think in terms of general good rather than in those of immediate individual profit.

It is a bad cat that hides under the meal of public indifference and private greed. Its claws are long, its teeth are sharp and it is swift to strike as many know to their pain. None the less so when it hides claws and teeth and purrs ever so softly in the guise of speculative improvement associations calling the world to admire its sleek fur.

Now, how shall we shake off the meal and show it as it is and not as it seems? Who will bell the cat, and how?

The Fool on the Job

THERE are many violations of "Safety First" rules (says the *Anode*) which can, by suggestion, warning or example, be minimized to a great extent. That of fooling on the job is one of these violations and worthy of mention. By fooling is meant pranks, wrestling, sparring, feats of prowess and daring, playing water hose on one another and other similar capers.

A man, while trying to escape a streaming hose, has been known to slip off a bridge and fall head first on a pile of rails. A heavy scar over his eye is striking testimony to the effect of fooling. Another man, while wrestling, ran an indelible pencil an inch and a half into his breast. Still another who scratched his hand while sparring, now knows all the agony of blood poison. These are mere instances of hundreds showing the heavy penalties extracted by this seemingly harmless yet dangerous practice of *fooling*.

Happily the class of men addicted to it is in the minority, composed mostly of the younger and more inexperienced workers. A foreman, to eliminate this evil, would require the eyes of an eagle and the stealth of a ferret, so it is up to the men themselves.

Around machinery it is a particularly dangerous practice, and if those so inclined would remember where they are, and that not only their own lives but those of their fellows are endangered by their actions, there would doubtless be fewer of the accidents that mar, maim and destroy.

A bulletin by the safety department of the Michigan Workmen's Compensation Mutual Insurance Company says:

Fooling, scuffling and horse-play have no place here.

If you are tempted to play a joke on someone think of what might result from your thoughtless bit of fun.

You would not want to injure a fellow-workman, causing him pain, loss of time from work and perhaps cripple him for life. It would worry you a great deal to know that you had caused such misfortune, but these things often happen when a practical joke is played.

Lend your support toward making this a safe place to work. Do not in any way contribute to the injury of a fellow-workman.

Digitized by Google

Accident Prevention in the Home

By H. W. Forster

Independence Inspection Bureau, Philadelphia, Pa.

Substance of a paper presented in connection with the Lewis Institute Safety Lecture Course under the auspices of the National Safety Council. Emphasis was laid upon the fact that it is possible to duplicate a large percentage of the industrial accidents in the home, there being mechanical equipment, sharp tools, ladders and steps, poisoning possibilities, slipping and tripping hazards, etc.

LADDERS.—Every home is equipped with at least one step ladder and frequently they are of poor design in so far as adequate strength and original rigidity are concerned; they do not have proper spreaders to prevent them from folding up and very commonly are in poor repair. The most expensive step ladder is seldom safe enough, and emphasis is to be laid upon the importance of buying always the best possible ladder that the market affords, and then keeping it in proper condition.

It is exceedingly hazardous to stand on the small folding shelf with which the average step ladder is provided, as it is by no means strong enough to carry a person's weight. The shelf is intended for water buckets and similar articles.

The straight ladder, not ordinarily found in the house, is commonly provided where a place is of some size, and the danger lies largely in the ladder not being kept from slipping when persons climb up on it.

One of the commonest causes of accidents in the use of ladders is to attempt to carry something with one hand and use the other to grasp the rungs. The safe way is to carry up a rope over the shoulder and then hoist the basket or sack containing the desired materials.

STOOLS

Closely associated with the ladder problem is that of steps or stools. Stepping on an ordinary packing box with a thin side is a dangerous operation, as is the use of a barrel turned upside down to act as a support. Not only will the barrel head break through, but a person may be badly cut by projecting nails which are left when the sections of a head are punched out.

Men have been injured and killed by falling two or three feet, and this hazard is particularly acute where the persons using the steps, stools or ladders are elderly. Their bones are brittle and their nervous condition less able to withstand a serious shock.

CHAIRS

A considerable number of injuries results from the breaking down of chairs, either because of originally weak design or because of defects. Particularly dangerous is the practice of standing on rocking chairs or on cane-seated chairs for the purpose of hanging pictures or reaching a higher point for some other reason.

STAIRS

Falls down stairs are exceedingly common in homes. This applies to everyone from the toddling infant to the gray-haired member of the household. The chief reasons for such falls are:

(*a*) Insufficient illumination. Many persons seem to think that stairs do not need lighting, obviously because for architectural reasons they are generally placed in the darker parts of the house, as against a division wall between two dwellings. Artificial lighting may be entirely warranted to illuminate an entire flight of stairs, but the light can be very small so that the current consumption is not heavy.

(*b*) Hand rails are absolutely essential to safety on stairs. They really should be provided on both sides, but at least on one side and that one the right hand side coming down. There is more danger of falling or of having a serious fall in going down, and as most persons are right handed the rail should be placed as suggested.

(*c*) Steepness. Steepness is a serious

Digitized by Google

matter. In industrial plants it is not generally permitted to have stairs with an inclination greater than 45 degrees with the horizontal, and if any important stairs in a house are steeper than this, it is worth while considering having them rebuilt. Winders are also dangerous for obvious reasons.

(*d*) The most common practice, perhaps, that causes falls is leaving some object lying on the stairs; persons not knowing of the obstructions step on them in ascending or descending.

It is a remarkable fact that the measuring ability of the human body is so accurate that a difference in rise of one-fourth, or sometimes only one-eighth of an inch, will cause persons to stumble. For example, if one step is seven inches high, and the next one is 7¼ inches high, one may stub his toe because of that difference. Similarly in going up or down stairs, a comparatively small object is likely to throw one off his balance and cause a serious fall. Absolutely nothing should be left upon steps.

(*e*) Runners. Unless firmly fastened down they are a distinct hazard on steps and should be removed.

SLIPPING

There are many reasons why persons fall in homes, the chief ones being:

(*a*) Bathtubs. The slippery part, being more or less covered with soap, is sometimes difficult to stand upon. As a result many persons, particularly elderly ones, are killed each year because of falls.

A tub set away from the wall affords a hand hold on each side. Where the tub is built in, there should be on the side next to the wall a firm grab rail to enable one to rise out of the tub at a minimum risk. Small rubber mats or other objects which can slip and upon which one is likely to place dependence should not be placed in a tub.

(*b*) Slippery Floors. The practice of having floors in the home as smooth and well-finished as possible results in many falls. It is not advocated that the principle of having smooth floors be abolished, but the wearing of rubber heels should be encouraged, as on a dry floor these make for a considerable degree of safety.

(*c*) Rugs. They have a habit of slipping. Particularly objectionable are small rugs at the top or bottom of stairs where persons step mildly upon them and with considerable forward thrust. Use larger rugs at these places, and consider fastening them to the floor at their corners.

TOOLS

The average home contains much more in the way of tools than a person might think. Among this class of hazard are:

(*a*) Knives and other sharp-edged tools. These, particularly if children get hold of them, cause a large number of accidents, some of them extremely serious.

In the average home, the women working in the kitchen ordinarily suffer many cuts in the course of a year. Tools should be placed in a safe place, large knives preferably in separate holders fastened to the wall, rather than placed in drawers with miscellaneous articles, reaching among which a person may come in contact with the sharp edge.

(*b*) Hammers, hatchets and axes may be dangerous for various reasons, chief among them being the possible flying off of the head because of insecure fastening.

(*c*) Monkey wrenches which have the jaws sprung frequently cause accidents when a person takes what he thinks is a firm hold upon a nut, pulls hard, and the jaws let go, followed by a fall.

(*d*) Mechanical equipment, such as electric or hydraulic clothes washers, wringers, etc., will have gears which may remove fingers, and a number of points where very serious and painful cuts, bruises and lacerations may result.

(*e*) The ice cream freezer has a set of gears which properly should be covered, especially as persons usually hold down the freezer with one hand while turning the crank with the other.

BURNS AND SCALDS

Many possibilities along these lines exist in the average household. Particularly dangerous is a boiling vessel on the stove to which a child may have access. Being pulled over it may seriously scald the child.

Many children and women have been scalded because of the dangerous practice of carrying a child and a bucket or

Digitized by Google

kettle of boiling water up the stairs at the same time.

The well known hazard of the match need scarcely be mentioned. Fortunately the use of safety matches in this country is increasing rapidly and it is hoped that before long we may follow the lead of other progressive nations and legislate out of existence anything which is not of the safety type.

The strike-on-the-box type is the true safety match, and is particularly to be desired where children may get hold of stray matches. The double-dip tip match, which is popular, is far safer than the old fashioned parlor match, but it is by no means as good as the strike-on-the-box type, especially where there are children in the family.

The open fire is beautiful, but distinctly dangerous if not adequately protected with a screen. Scores, if not hundreds, of children are burned to death annually in this country through coming in contact with such exposed fires.

POISONS

In practically every home is found a considerable number of dangerous substances, some of which are violent poisons. Particularly hazardous is the practice of placing these various bottles and boxes in the family medicine closet along with harmless things.

Poisons properly belong in an entirely separate closet, where nobody, in the night and half asleep, is likely to take hold of the wrong bottle or box. If it is impossible to place the two classes of remedies in separate closets, the poisons at least should be placed on a different shelf and every bottle should be clearly marked.

There have been in the country, and perhaps on an increasing scale, many fatalities due to mistakes in taking medicines. Particularly the women with sick headaches take the wrong pills. It is to be hoped that before long the country will have the universal habit of putting poisonous liquids and pills in odd-shaped containers. In fact it is already the practice to an extent of making poisonous pills or tablets in a distinctive form.

ELECTRICAL

The average person has an idea that the ordinary house lighting current, usually 110 volts, is not dangerous to life. The contrary is true, though the number of fatalities which result is a comparatively small percentage of the number of serious shocks which are sustained.

The danger is greater where persons have weak hearts, and the hazard is greatly increased if one's body is wet, as with perspiration, standing in water, or in the bathtub, or standing with the hand on a plumbing fixture, or where in any way there is a first class contact between one's body and the ground.

Safe practice requires that in cellars there shall be pull cords or chains having an insulating section, so that the current cannot travel down the chain or cord in case of a defect in the socket.

It is also good practice to have the control in the bathroom by means of a push-button, flush type, located near the door, so there will be no need nor tendency to turn on a socket over a wash-basin while one hand is on the faucet.

It is simply criminal to use such a device as a massage vibrator while sitting in a bathtub. Not long ago a woman in an eastern city was killed while thus engaged and investigation developed the fact that the vibrator was defective, and the current passed through her hand down into the water in the tub and through the plumbing pipe into the ground.

It is little less than criminal to subject a person to an unexpected shock, considering it a good practical joke. Not only is the shock likely to seriously injure or perhaps actually kill the victim, but frequently the shock will result in a fall from some high place.

Digitized by Google

Principles of Safeguarding

By Robert J. Young

Manager, Department of Safety and Relief, Illinois Steel Company.

THE industrial world is awakening to the enormous loss that is being sustained in this country each year through accidents and is calling for men who have been thoroughly trained in the conservation of life and limb. This opens a wonderful field for the technical man and especially for the engineer. The demand for engineers who have received special training in this line of work is increasing. The time is not far distant when an engineer's education will not be considered complete if he be not thoroughly versed in the methods of accident prevention in all its branches. This is as it should be, since it is to the engineer that we turn for plans of our buildings, yards, machinery, etc. In the drawing of these plans and the designing of these machines the first and most important steps toward accident prevention should be taken. First, let us consider broadly the question of designing plants and buildings.

In laying out the plans for a plant it is necessary that care be exercised to so locate the buildings that the transfer of material from one building to another shall be direct and without unnecessary handling. Fewer difficulties placed around the handling of material not only decreases the cost of operation but proportionately increases the safety of the workmen.

One of the prime considerations in designing a building, aside from making it sufficiently strong to bear the loads it will be called upon to carry is to provide ample room in which to safely carry on the work of operation. Frequently we see buildings which appear to have been planned without a thought as to how much space will be left after the machinery is placed and the result is deplorable, not only from a safety standpoint but from the operating one as well. The heating and ventilation of the buildings should be carefully considered, as the welfare and comfort of the workmen have a considerable bearing on accident causes and prevention; also the proper illumination of the buildings, both natural and artificial light, giving a general diffused light so placed as to eliminate dark shadows.

In laying out the yards serving the buildings care should be used in locating roadways and walks. It is important that they be well defined as this has a tendency to keep the workmen from taking short cuts over dangerous places. Care should also be taken to see that proper clearances are given along railroad tracks, so that men may not be crushed between moving cars and structures, doorways of buildings, platforms, etc.

Provision for keeping the buildings and yards orderly and clean should be made, as disorderly, cluttered-up conditions are sure to cause accidents as well as tending toward making workmen careless and slovenly in the work they do.

It is important that we study the causes of accidents in general and the hazards to be met before we attempt to provide efficient remedies.

The causes of accidents fall into two general classes, namely, the failure to provide safeguards and ignorance or carelessness on the part of workmen.

We are to consider the principles of safeguarding particularly with reference to mechanical appliances. John Calder, president of a large industrial equipment company, recognized as one of the leading safety experts in this country, has divided the elements which create the danger in machines into eight items, not considering structures, prime movers and transmission apparatus, as follows:

1. All engaging toothed or other gears, rolls, drums and slides of every description on any machine.

2. The spaces between fixed and moving parts of any machine, or between the latter and structures near it, leaving in-

Digitized by Google

sufficient working clearance—in no case less than 18 inches—for any person employed thereon or near it.

3. Pulleys and clutches.

4. Belts, bands and driving chains.

5. Flywheels and starting balance wheels.

6. Shafting and spindles and all couplings or projections thereon or upon reciprocating or moving parts of machines.

7. Counterweights and balance gears and their suspensions.

8. The actual element on every machine which comes into contact with the work and cuts, shears or otherwise operates upon the latter; for instance, the circular saw blade on the saw mill, the punch and die in the press, the revolving cutter in the milling machine, etc.

In designing guards for mechanical appliances, we must consider: The efficiency of the guard to protect workmen; effect upon output of machines; cost of installation and maintenance.

An efficient guard must meet all of the above requirements and experience has taught us that there are practically no situations which cannot be adequately guarded.

The efficiency of the guard to protect the workman is, of course, the first consideration. An inadequate guard is worse than no guard at all, as the workman is led to believe he is protected, whereas a trap has been set which will catch him sooner or later.

EFFECT UPON OUTPUT OF MACHINE

The fact that a machine is designed to produce certain material in certain quantities must not be lost sight of, and the output of the machine should not be decreased through the installation of guards.

The installation of a guard frequently increases the output of a machine by increasing the confidence of the operator. This is particularly true regarding stamping and punch presses; machines which, when unguarded, are a great source of accidents.

COST OF INSTALLATION AND MAINTENANCE

Although a guard should furnish adequate protection, one should not lose sight of the cost side of the question. One sometimes sees guards which are adequate, but good money has been thrown away in making them too elaborate. In some cases a guard has been installed at a cost of about $200, when a guard quite as adequate for safety and much more efficient from an operating standpoint, can be installed at a cost of less than $25.

Wherever practicable, guards should be constructed of metal, as it insures stability and lower cost of maintenance.

In order to carry on the work of making guards economically and at the same time efficiently, there must be a systematic method of doing the work.

By providing proper machines and grouping them so that the material can be quickly handled from one to the other, and by having special gangs to do the work of making the guards and installing them, a large reduction in cost is obtained.

Machines for guard making:

High speed drill; capacity up to ½-inch hole.

Punch; capacity up to ⅜-inch plate.

Shear; regular or alligator type.

Rolling machine; capacity up to ⅜-inch plate; minimum 24 inches wide.

Heavy iron block for forming.

Riveting machine.

The above mentioned machines have been found to meet the necessities of such a system and in one large company the cost of making guards has been cut in half in many instances over the old system of trying to make guards on machines which are used for other purposes in addition to the guard making, and by using men who are frequently called away from the work to other duties.

The system followed is to have one man make sketches of the guards needed. He then forms a gang of two metal workers and two helpers to make the guards, and a gang composed of a machinist, a metal worker and a helper to install the guards. While the work of making the guards is going on, these men give their undivided attention to that work.

STANDARDIZATION

In order to insure the installation of proper safeguards and the maintenance

Digitized by Google

of safe conditions, the work must be standardized and a system of checking provided. Many companies have prepared standard specifications and drawings covering safety devices which are placed in the hands of the engineering and mechanical departments with the requirement that all designs made in the drafting rooms and all guards installed in the field must conform to these standards.

In conjunction with the adoption of construction rules and standard guards an adequate checking system is necessary. In order to insure that the matter will not be overlooked, signs are placed in the drafting room calling attention to the necessity for the checking of all drawings to see that full protection is made in accordance with the rules and standards.

To make the checking more efficient a number of plants require each tracing to have as a part of its title an item "Checked for Safety." According to the hazards in the different departments stickers are provided to cover the different items of hazard. These are attached to the tracing by the engineer and show the draftsman what he is to check for and what factors of safety to allow. He must then initial the tracing so checked by him as an indication of the fact that attention has been given to the necessary safety items.

A further check is important and possible by the purchasing department when machines are purchased in the market. In some industrial concerns all requisitions sent to the purchasing agent from the plants are required to have indicated upon them the fact that safety requirements have been given consideration at the works, and the purchasing agent is not permitted to order the machines or machine tools covered by the requisitions unless such a notation is stamped thereon. It is also the custom in many industrial concerns for the purchasing agent to stamp upon his "request for bids" some reference to safety requirements.

By standardizing safety devices we eliminate the dangers arising from improper, unsubstantial and inconsistent guards. In other words, we insure the best protection at the least expense.

Although one will discover as one continues his study of this subject that a majority of accidents can be traced to carelessness or to the human equation, the fundamental fact must not be forgotten that so far as mechanical equipment constitutes the immediate cause in a given accident, that accident would not have happened even though the exciting cause were a careless workman, if the particular mechanical equipment were safeguarded.

Another feature that must not be lost sight of is the fact that the employer cannot hope to gain the confidence and co-operation of the workmen unless, and until, he proves his sincerity in the work by tangible evidence. As more than two-thirds of the accidents can be prevented only by care and co-operation on the part of the men, it is clear that success in the work will not be attained unless he does his full share in guarding dangerous places in an efficient manner and in providing proper working conditions for all his employes.

American Society of Safety Engineers

THE regular monthly meeting of the American Society of Safety Engineers was held on September 27, in the Engineering Societies' building, 25 West 39th street, New York City. The meeting was addressed by D. C. Pultney on safety as accomplished by the manufacturer. The address was illustrated with original lantern slides. Mr. Pultney is director of safety for the Westinghouse Electric and Manufacturing Company, Pittsburgh, Pa. He has under his supervision from 25,000 to 30,000 employes, and is, therefore, a man well qualified to talk upon the subject assigned to him.

Digitized by Google

Safety Work in the Piano Industry

THE "Safety First" activities as carried on by the Kohler Industries, New York City, are well conducted, and have minimized accidents to a remarkable degree among the army of workmen employed by this concern. The safety problem confronting these industries was a complex one at the start—a chain of associated factories, all engaged, it is true, in producing pianos, but each factory specializing in different styles and parts. While each factory is operated as an associated unit, nevertheless in the management the personality of each of the executives and superintendents in charge is clearly expressed and causes many minor differences in operation.

The working forces run in the neighborhood of 3,500 employes and range from common laborer to the highly skilled artisan in the piano, machinery and woodworking trades. The fact that 16 different languages are spoken adds largely to the difficulty of the safety problem.

A central safety committee was formed, its membership comprising the manager of the employment department, the superintendent of maintenance and the superintendent of each individual factory. This was organized as a permanent committee and meetings are held monthly. This committee, in turn, refers and makes all recommendations involving any large expenditure, change of policy, etc., to the executive board of the industries.

A subcommittee was then organized in each factory; the superintendent serving as permanent chairman and the other members constantly changing with a term of service of one month. In each factory the size of this committee is determined by the number of employes, there being one member appointed for every 100 workmen. These subcommittees have proven most effective. Their members make regular weekly inspections of every floor in the different buildings, reporting any improper conditions that may exist and making recommendations for improvements. Special forms are provided for these reports and a first class, concise report is always commended.

Every accident, before report is made to the State industrial commission, is investigated by these subcommittees and recommendations made to prevent recurrence of accidents of similar nature.

At the commencement of the safety campaign, the central safety committee was given authority for an expenditure to properly guard all machinery, belting, electric switches, etc., that had not previously been taken care of.

An adequate supply of danger and educational safety signs was also purchased. A conspicuous little label reading "Be Careful" was designed by one of our workmen and has been found of definite service. Uniform "Safety First" bulletin boards were placed on each floor of the factories and educational literature is posted weekly. In this connection the bulletins and literature sent out by the National Safety Council and the American Museum of Safety have furnished excellent material.

In many cases the foremen have demonstrated initiative of the right kind. One foreman has inclosed an electric light of high candle power in a box which reads on all sides through a green transparency "Safety First."

The Kohler Industries have for a long time operated with marked success a suggestion system, and awarded substantial cash prizes for suggestions of merit and improvement. It has been a good index of the progress of the safety campaign to note the large percentage of suggestions which are daily received on safety devices and measures. These suggestions are referred to the central safety committee and wherever feasible and practicable are put into effect.

The superintendent of one of the associated plants has worked out a schedule for rating each department for its efficiency in safety work. His idea has proven of such value in his factory that it has now been generally adopted in all the plants. This schedule furnishes a concrete basis for safety work and it is

Digitized by Google

not only necessary to secure the attention of your workmen, but also to furnish them with a definite working basis in order to maintain their interest.

The departments are generally analyzed into 18 divisions for which the safety inspectors in making their weekly rounds are to take into consideration: 1. Floors. 2. Benches. 3. Machines. 4. Toilets. 5. Sinks. 6. Lockers. 7. Lights. 8. Glue Boilers. 9. Barrels and Boxes. 10. Yard. 11. Passageway. 12. Stock. 13. Oily Waste. 14. Window Sills. 15. Safeguards. 16. Floor Space. 17. Doors. 18. Fire Appliances.

Floors are subdivided into the captions, "Unclean, Oil, Water, Rubbish," and a penalty of 9 points charged the department for each one of these conditions found.

Machines are subdivided into Unclean, Unguarded or Running with Operator Away, and a penalty of 9 points charged on each of these scores.

Safeguards are reported on the scores of Not Used or Out of Repair, and a penalty of 7 points charged on each score.

All departments are rated weekly in this manner and the rates conspicuously posted. This injects the spirit of competition. We feel that while creditable strides have been made in safety work there is a never ending improvement to be made along educational lines. We have also found that two of the greatest causes of accidents are congestion and rush work. Double your working force and you more than double your accidents. Increase your output and your accident ratio will climb. If any factory can maintain an average accident ratio in rush time, it may well claim high efficiency for its organization.

J. T. Holmes, superintendent of the maintenance department, and a member of the safety committee, says:

"The factory committees meet in regular meeting once a week to discuss causes of accidents that have occurred and their elimination. Also to check up the recommendations of the previous meeting for the elimination of hazards and to report whether these have been eliminated or not. We find our system has a tendency to reduce accidents to a minimum, in fact has brought them down to a low percentage. I am of the impression that our last statistics show that our percentage of accidents in relation to the men employed is not over one quarter of one per cent. It might also interest you to know that all our committeemen are supplied with badges, and we make use of special stationery in our safety committee work for the transaction of business and for making out reports. The reports, of course, are filed away for future reference and indicate the activities of the committee."

Safety or Sorrow

THE Fore River Shipbuilding Corporation awarded two prizes for the best original safety suggestions from wives, mothers, sisters or daughters of employes of the company. The first prize of $25 was awarded for the "S O S" design shown in the opposite column.

The second prize of $10 was awarded for the following original letter:

A WIFE SAYS: "I know that it is out of consideration for the children and me that you have taken out this accident insurance policy. I wish, dear, that you would take out a policy in the new insurance company that has started so well at the Fore River yard, the one that is called 'Safety First.' It not only returns its

SAFETY OR SORROW

yearly premiums annually, but as a bonus *guarantees long life and happiness* to its many subscribers. I am sure that the wives and kiddies of the men that build ships will feel more secure from accidental hard times when everyone is a policyholder in 'SAFETY FIRST.'"

Digitized by Google

Fifth Annual Safety Congress

Under the Auspices of the National Safety Council

THE program for the fifth annual safety congress to be held in Detroit on October 17, 18, 19 and 20, under the auspices of the National Safety Council, is given in full herewith. An epitome of the sessions and dates:

SESSIONS	DATES
Accident Statistics Committee.	Oct. 16
Arrangements Committee	" 16
Banquet	" 19
Business Meeting	" 17
Cement Section	" 20
Chemical Section	" 18
Danger Signs Committee.....	" 16
Danger Signs, Special Session.	" 17
Electric Railway Section.....	" 19
Employes' Benefit Association Section	" 20
Executive Committee	" 16
Exhibit of Commercial Safety Devices	" 16-20
First Aid Contests.....	" 20
Foundry Section	" 18
General Round Table Session.	" 17
Governmental Section	" 20
Health Service Section.....	" 18-20
Home Safety Committee.....	" 16
Interstate First Aid Contests..	" 20
Iron and Steel Section.....	" 18-20
Local Council Officers' and Committee Meetings	" 16
Logging, Lumbering and Woodworking Section	" 20
Mining Section	" 18-19
Paper and Pulp Manufacturers' Section	" 19-20
Program Committee	" 16
Public Safety Section.....	" 20
Public Utilities Section.....	" 18
Resolutions Committee	" 16
Safe Practices Committee.....	" 16
Sectional Committees	" 16
Sectional Round Table Sessions	" 18-20
Steam Railroad Section.....	" 18-20
Textile Section	" 19

Monday, October 16, 1916

SPECIAL COMMITTEE MEETINGS, 10 a. m. to 4 p. m., for conferences and making final preparations for opening of congress:

Accident Statistics Committee.
Arrangements Committee.
Danger Signs Committee.
Executive Committee.
Home Safety Committee.
Officers and Committees of Local Councils.
Program Committee.
Sectional Committees.
Resolutions Committee.
Safe Practices Committee.
Luncheon for all committees at 1 p. m.

Tuesday, October 17, 1916

Registration of Members, Representatives of Members ,and Visitors, 9 a. m. to 10 a. m.

ANNUAL MEETING OF MEMBERS, 10 a. m. to 12 noon. Arthur T. Morey, President, Presiding Officer.

Order of Business:
Prayer.
Address of Welcome—John M. Eaton, President, Detroit Local Council.
Response by the President.
Roll Call, or other ascertainment of members present.
President's Address.
Reading and disposal of unapproved minutes.
Reports of officers and committees.
- Secretary and Treasurer.
- Executive Committee.
- Finance Committee.
- Program Committee.
- Resolutions Committee.
- Safe Practices Committee.
- Home Safety Committee.
- Accident Statistics Committee.
- Danger Signs Committee.
- Fire Prevention Committee.
- Section Committees.
- Nominating Committee.

Election of Directors.
Unfinished Business.
New Business.

Tuesday, October 17, 1916

GENERAL ROUND TABLE DISCUSSION, 2 p. m. to 5 p. m.

Chairman, H. W. Forster, Chief Engineer, Independence Inspection Bureau, Philadelphia, Pa.

Topic for Discussion—"Maintaining Interest in Accident Prevention."

Accident Prevention is now an established national institution in the United States. There is no question as to its necessity and efficiency in the industries. Nevertheless, many employers have difficulty in maintaining interest after the first enthusiasm is worn off.

This Round Table Meeting will give the opportunity:

(1) To explain and discuss various methods successfuly tried out by members in maintain-

Digitized by Google

ing continual progress in Accident Prevention; and

(2) To ask questions and exchange views.

Tuesday, October 17, 1916

Special meeting to consider the adoption of Universal Danger Signs, 8 p. m. to 10 p. m.

Chairman, Dr. F. D. Patterson, Chief, Division of Hygiene and Engineering, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.

Sub-Committee Reports:

Universal Danger Signs Problem, W. L. Chandler, Chairman.

Interior Signs, Sydney W. Ashe, Chairman.

Road Signs, J. A. McCrea, Chairman.

Special Address—"Light and Its Relation to Danger Signs." Experimentally demonstrated, Sydney W. Ashe, Educational and Welfare Department, General Electric Company, Pittsfield, Mass.

Wednesday, October 18, 1916

SECTIONAL ROUND TABLE MEETINGS, 9:30 a. m. to 12 noon.

The sectional meetings will be composed of groups of persons interested in accident prevention problems of specific character or of special industries.

Experience Meetings—The Chairman of each Sectional Round Table Meeting will announce that an "experience" meeting will follow the discussion of the topics assigned to each sectional program. Employers, committeemen and others will have an opportunity to tell about their own experiences in Safety and to ask questions.

9:30 a. m. to 12 noon.

Chemical Sectional Meeting.
Foundry Sectional Meeting.
Iron and Steel Sectional Meeting.
Mining Sectional Meeting.
Public Utilities Sectional Meeting.
Steam Railroad Sectional Meeting.

2 p. m. to 5 p. m.

Health Service Sectional Meeting.
Steam Railroad Sectional Meeting.

Wednesday, October 18, 1916

CHEMICAL SECTIONAL MEETING, 9:30 a. m. to 12 noon.

Chairman, J. R. de la Torre Bueno, Editor, General Chemical Bulletin, General Chemical Company, New York City. Vice Chairman, L. A. De Blois, Engineering Department, Safety Division, E. I. Du Pont de Nemours & Co., Wilmington, Del. Secretary, I. V. Kepner, Pennsylvania Salt Manufacturing Company, Natrona, Pa.

Report of Chairman.
Report of Secretary.
Reports of Committees.
Appointment of Nominating Committee.
Twenty Minute Discussions:

"Health Problems in the Chemical Industry." Dr. George M. Price, Director, Joint Board of Sanitary Control, New York City.

"The Goggle Problem in the Chemical Industry." J. R. de la Torre Bueno, Editor, General Chemical Bulletin, General Chemical Company, New York City.

"Care of Workmen Employed in the Manufacture of Aniline and Benzol Products," A. B. Mitchell, Benzol Products Company, Marcus Hook, Pa.

"Fume Poisoning from Nitric and Mixed Acids." L. A. De Blois, Engineering Department, Safety Division, E. I. Du Pont de Nemours & Co., Wilmington, Del.

Report of Nominating Committee and election of officers.

Wednesday, October 18, 1916

FOUNDRY SECTIONAL MEETING, 9:30 a. m. to 12 noon.

Chairman, O. J. Fehling, Manager, National Malleable Castings Company, Chicago, Ill. Vice Chairman, F. G. Bennett, Safety Department, Buckeye Steel Castings Company, Columbus, O. Secretary, Earl B. Morgan, Safety Engineer, Norton Company, Worcester, Mass.

Report of Chairman.
Report of Secretary.
Reports of Committees.
Appointment of Nominating Committee.
Fifteen Minute Discussions:
Employment Problem as Related to Safety.

"Strains, Sprains and Burns." S. W. Ashe, Educational and Welfare Department, General Electric Company, Pittsfield, Mass.

"Crane and Chain Practices." F. H. Elam, Manager, Casualty Department, American Steel Foundries, Chicago.

"Eye Protection." F. W. Shepard, Safety Inspector, American Cast Iron Pipe Company, Birmingham, Ala.

"Alcohol vs. Safety." Dr. H. P. Hourigan, Surgeon, Larkin Company, Buffalo, N. Y.

"Foundry Sanitation." J. F. Alexander, Secretary, The Metal Trades Safety Association, Toronto, Can.

Report of Nominating Committee and election of officers.

Wednesday, October 18, 1916

IRON AND STEEL SECTIONAL MEETING, 9:30 a. m. to 12 noon.

Chairman, J. M. Woltz, Safety Director, Youngstown Sheet & Tube Company, Youngstown, Ohio. Vice Chairman, George T. Fonda, Safety Engineer, Bethlehem Steel Company, South Bethlehem, Pa. Secretary, Earl B. Morgan, Safety Engineer, Norton Company, Worcester, Mass.

Report of Chairman.
Report of Secretary.
Reports of Committees.
Appointment of Nominating Committee.
Fifteen Minute Discussions:

"Progress of Safety in Iron and Steel Industry." (Illustrated with Lantern Slides.) Dr. Lucian W. Chaney, U. S. Department of Labor, Washington, D. C.

"Safety in Blast Furnace Operation." F. H. Wilcox, Engineer, U. S. Bureau of Mines, Pittsburgh, Pa.

"Safety in Bessemer Operations." J. H. Ayres, Superintendent of Safety, Sanitation and Welfare, National Tube Company, Na-

Digitized by Google

tional Works, McKeesport, Pennsylvania.

"Safety in Open Hearth Operations." Discussion. Walter Greenwood, Safety Inspector, Carnegie Steel Company, Youngstown, Ohio.

BUFFET LUNCHEON AND SMOKER, 6 p. m. to 10 p. m.

Committee: M. E. Arkills, Safety Engineer, Pullman Company, Pullman, Ill.; C. B. Auell, Director Standards, Processes and Materials, Westinghouse Electric Company, East Pittsburgh, Pa.; J. H. K. Burgwin, Chairman Committee on Safety, Crucible Steel Company, Pittsburgh, Pa.; C. E. Pettibone, Chief Safety Inspector, Pickands, Mather & Co., Cleveland, Ohio; H. J. Weeks, District Accident and Safety Inspector, American Steel & Wire Company, Cleveland, Ohio.

Wednesday, October 18, 1916

MINING SECTIONAL MEETING, 9:30 a. m. to 12 noon.

Chairman, H. M. Wilson, Director, Department of Inspection and Safety, The Associated Companies, Pittsburgh, Pa. Vice Chairman, B. F. Tillson, New Jersey Zinc Company, Franklin Furnace, N. J. Secretary, H. M. Wolflin, Engineer, U. S. Bureau of Mines, Pittsburgh, Pa.

Report of Chairman.

Report of Secretary.

Reports of Committees.

Appointment of Nominating Committee.

Fifteen Minute Discussions:

"Accident Statistics." Albert H. Fay, U. S. Bureau of Mines, Washington, D. C.

"Mine Safety Signs and Signals." D. J. Parker and Edwin Steidle, U. S. Bureau of Mines, Washington, D. C.

"Qualifications of a Mine Foreman." J. W. Paul, Consulting Mining Engineer, Pittsburgh, Pa.

"Workmen's Compensation and Its Effect on Safety in Mining." H. M. Wilson, The Associated Companies, Pittsburgh, Pa.

"Mine Accidents and Their Prevention." H. G. Davis, Coal Mining Department, Delaware, Lackawanna & Western R. R., Kingston, Pa.

"Relation of Workmen's Compensation Laws to Accident Prevention Movement." Dr. F. D. Patterson, Chief, Division of Hygiene and Engineering, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.

"Underground Sanitation at the Mines." W. A. Borchard, Austinville, Va.

SMOKER, 8 p. m. to 10 p. m.

B. F. Tillson, New Jersey Zinc Company, Franklin Furnace, N. J., Chairman.

Wednesday, October 18, 1916

PUBLIC UTILITIES SECTIONAL MEETING, 9:30 a. m. to 12 noon.

Chairman, H. C. Lucas, Treasurer, Philadelphia Electric Company, Philadelphia, Pa. Vice Chairman, J. B. Douglas, Manager, Claim Department, United Gas Improvement Company, Philadelphia, Pa. Secretary, G. H. Smith, Assistant District Superintendent, Central Hudson Gas & Electric Company, Newburgh, N. Y.

Report of Chairman.

Report of Secretary.

Reports of Committees.

Appointment of Nominating Committee.

Fifteen Minute Discussions:

"Station Safeguarding." Charles Penroso, Construction Engineer, Philadelphia Electric Company, Philadelphia, Pa.

"Accident Prevention in the Commercial Department of a Large Gas Company." C. W. Clabaugh, Vice President, Omaha Gas Company, Omaha, Neb.

"Safety from the Economic Standpoint." B. Frank Day, Statistician, The Philadelphia Electric Company, Philadelphia, Pa.

"Safety Wrinkles Around a Gas Works." G. I. Vincent, Engineer, Des Moines Gas Company, Des Moines, Ia.

Report of Nominating Committee and election of officers.

Wednesday, October 18, 1916

STEAM RAILROAD SECTIONAL MEETING, 9:30 a. m. to 12 noon.

Chairman, M. A. Dow, General Safety Agent, New York Central Lines, New York City. Vice Chairman, J. M. Guild, Safety Agent, Union Pacific Railroad, Omaha, Neb. Secretary, H. J. Bell, Safety Inspector, Chicago & North Western Railway Company, Chicago.

Report of Chairman.

Report of Secretary.

Reports of Committees.

Appointment of Nominating Committee.

Fifteen Minute Discussions:

"The Prevention of Accidents." R. C. Richards, Chairman, Central Safety Committee, Chicago & North Western Railway, Chicago.

"The American Railroad Passenger."

(a) What the Railroads Have Done and Are Doing for His Safety.

(b) What He Would Do for His Own Safety. G. L. Wright, Superintendent Safety Bureau, Chicago, St. Paul, Minneapolis & Omaha R. R., St. Paul, Minn.

Discussion. S. E. Burkehead, Assistant General Manager, International & Great Northern Railway, Houston, Texas.

"Railroad Trespassing—Its Prevention a Public Duty." A. A. Krause, Commissioner of Safety, M. K. & T. Ry., St. Louis, Mo.

Discussion. C. F. Merrill, Superintendent, Lehigh & Hudson River Ry., Warwick, N. Y.

Discussion. D. A. Klump, Chairman, General Safety Committee, Pere Marquette R. R., Grand Rapids, Mich.

Wednesday, October 18, 1916

AFTERNOON SESSION, 2 p. m. to 5 p. m. Health Service Section, Steam Railroad Section.

HEALTH SERVICE SECTIONAL MEETING, 2 p. m. to 5 p. m.

Chairman, Dr. Otto P. Geier, Director, Employes Service Department, Cincinnati Milling Machine Company, Cincinnati, Ohio. Vice Chairman, Dr. J. W. Schereschewsky, U. S. Public Health Service, Pittsburgh, Pa. Secretary, G. L. Avery, Secretary, The Avery Company, Peoria, Ill.

Digitized by Google

Report of Chairman.
Report of Secretary.
Reports of Committees.
Appointment of Nominating Committee.
Addresses.
"Health Service Work as an Efficiency Factor." Dr. Otto P. Geier.
"Health Education." Dr. L. G. Shoudy, Chief Surgeon, Bethlehem Steel Company, South Bethlehem, Pa.
"Physical Examination of Employes." Dr. Wilbur E. Post, Chief Medical Adviser, Peoples Gas, Light & Coke Company, Chicago.
"First Aid." Dr. J. C. Bloodgood, Medical Department, Johns Hopkins University, Baltimore, Md.
"Occupational Diseases." Dr. E. R. Hayhurst, Director, Division of Industrial Hygiene, Ohio State Board of Health, Columbus, Ohio.
"Health Insurance." A. W. Whitney, General Manager, National Workmen's Compensation Service Bureau, New York City.

Wednesday, October 18, 1916

STEAM RAILROAD SECTIONAL MEETING (Continued), 2 p. m. to 5 p. m.
Fifteen Minute Discussions:
"Railway Crossing Accidents." (a) Their Cause. (b) How They Can Be Reduced. John S. Rockwell, General Agent, Buffalo, Rochester & Pittsburgh Ry., Rochester, N. Y.
Discussion. C. M. Anderson, Superintendent of Safety, Nashville, Chattanooga & St. Louis Ry., Nashville, Tenn.
Discussion. D. J. Williams, Secretary, North Arkansas Safety Committee, Missouri & North Arkansas R. R., Harrison, Ark.
"How Should the Members of Safety Committees Be Selected and for What Length of Time Should They Serve?" E. R. Scoville, Chairman, General Safety Committee, Baltimore & Ohio R. R., Baltimore, Md.
Discussion. L. E. Abbott, Safety Commissioner, Oregon Short Line R. R., Salt Lake City, Utah.
Discussion. Frank A. Wightman, Superintendent of Safety, St. Louis & San Francisco R. R., Springfield, Mo.
"In Order to Secure the Best Results in Safety Work What Should Be the Relation of the Railroad Company and Its Officers to the Safety First Organizations?" J. M. Guild, Safety Agent, Union Pacific R. R., Omaha, Neb.
Discussion. A. D. Brown, Chairman, General Safety Committee, Pittsburgh & Lake Erie R. R., Pittsburgh, Pa.
Discussion.

Thursday, October 19, 1916

MORNING SESSION, 9:30 a. m. to 12 noon.
Sectional Meetings.
Electric Railway Section.
Iron and Steel Section.
Mining Section.
Paper and Pulp Manufacturers' Section.
Steam Railroad Section.
Textile Section.

Thursday, October 19, 1916

ELECTRIC RAILWAY SECTIONAL MEETING, 9:30 a. m. to 12 noon.
Chairman, George Oliver Smith, Supervisor of Safety, Doherty Operating Company, New York City. Vice Chairman, Edward C. Spring, Assistant to President, Lehigh Valley Transit Company, Allentown, Pa. Secretary, C. B. Scott, General Manager, Bureau of Safety, Chicago, Ill.
Report of Chairman.
Report of Secretary.
Reports of Committees.
Appointment of Nominating Committee.
Fifteen Minute Discussions:
"How the Attitude of the Public Toward the Railroad Company Is Influenced by Systematic Safety Work." Russel A. Sears, General Attorney, Boston Elevated Railway Company, Boston, Mass.
(Title of address to be announced later.) F. R. Coates, President, Toledo Railway and Light Company, Toledo, Ohio.
"How Graphic Charts and Bulletins Help in Safety Education." Harold W. Clapp, General Superintendent, Columbus Railway, Power & Light Company, Columbus, Ohio.
"Safety and Efficiency—How a New Member Tackles the Problem." Julien H. Harvey, Superintendent of Efficiency, Kansas City Railway Company, Kansas City, Mo.
"How the Safety Movement Is Helping the Electric Railway Industry Meet Its Problems." Prof. H. H. Norris, Associate Editor, *Electric Railway Journal*, New York City.

Thursday, October 19, 1916

IRON AND STEEL SECTIONAL MEETING (Continued), 9 30 a. m. to 12 noon.
Fifteen Minute Discussions:
"Achievements and Possibilities of Accident Prevention in American Industries." Dr. F. L. Hoffman, Statistician, Prudential Life Insurance Company, Newark, N. J.
"Employment." A. H. Young, Supervisor of Labor and Safety, Illinois Steel Company, South Chicago, Ill.
Discussion. J. M. Larkin, Secretary, Safety Committee, Fore River Shipbuilding Company, Quincy, Mass.
"Origin of Safety Methods and Prevention of Infection." Dr. C. C. Booth, Chief Surgeon, Republic Iron & Steel Company, Youngstown, Ohio.
Discussion. Dr. L. A. Shoudy, Chief Surgeon, Bethlehem Steel Company, South Bethlehem, Pa.
"The Duties of the Visiting Nurse." Miss Florence Wright, Clark Thread Company, Newark, N. J.

Thursday, October 19, 1916

MINING SECTIONAL MEETING (Continued), 9:30 a. m, to 12 noon.
Fifteen Minute Discussions:
"Safety in Hoisting and Slope Haulage." O. P. Hood, Chief Mechanical Engineer, U. S. Bureau of Mines, Pittsburgh, Pa.
"Mine Inspection." William H. Jobe, Mine Inspector, Crystal Falls, Mich.

Digitized by Google

"Welfare Work." E. E. Bach, Mine Safety Director, Ellsworth Collieries Company, Ellsworth, Pa.

"Mine Fires and Their Recovery." Prof. J. C. Roberts, Professor of Safety and Efficiency Engineering, Colorado School of Mines, Golden, Colo.

"Mine Rescue Apparatus—Its Value as a Safety Measure." Oscar Cartledge, Ottawa, Ill.

"Metal Mine Accidents and Their Prevention." Prof. F. W. Sperr, School of Mines, Houghton, Mich.

"Education of Miners in Safety." C. S. Stevenson, Cleveland Cliffs Iron Company, Ishpeming, Mich.

Thursday, October 19, 1916

PAPER AND PULP MANUFACTURERS' SECTIONAL MEETING, 9:30 a. m. to 12 noon.

Chairman, S. F. Shattuck, Treasurer, Kimberly-Clark Company, Neenah, Wis. Vice Chairman, A. G. Richardson, Accident Inspector, Laurentide Company, Ltd., Grand Mere, P. Q., Can. Secretary, E. P. Gleason, Nekoosa-Edwards Paper Company, Port Edwards, Wis.

Report of Chairman.

Report of Secretary.

Reports of Committees.

Appointment of Nominating Committee.

Fifteen Minute Discussions:

"Paper Mill Lighting."

"Guarding of Electrical and Steam Machinery in Paper Mills."

"Various Types of Calender Guards."

"Elevators—How Used and How to Avoid Accidents While Being Used."

"Paper Mill Ventilation."

Thursday, October 19, 1916

STEAM RAILROAD SECTIONAL MEETING (Continued), 9:30 a. m. to 12 noon.

Fifteen Minute Discussions:

"The Most Frequent Causes of Injury to Track and Bridgemen and the Best Way to Eliminate These Causes." Chas. T. Banks, Supervisor of Safety, Erie R. R. Company, New York City.

Discussion. L. F. Shedd, Safety Supervisor, Chicago, Rock Island and Pacific Railroad, Chicago.

Discussion.

Shop Accidents—

(a) What Has Been Accomplished in Their Reduction?

(b) How Was It Done and What More Can Be Accomplished? B. C. Winston, General Claim Agent, Wabash Railway, St. Louis, Mo.

Discussion. F. F. Backus, Assistant to President, Toronto, Hamilton & Buffalo Ry., Hamilton, Ont.

Discussion. G. L. Avery, Secretary, The Avery Company, Peoria, Ill.

"How Shall Injuries Resulting from Train Operation Other Than Collisions and Derailments Be Prevented?" F. M. Metcolf, Special Representative, First Vice-President Northern Pacific Railway Company, St. Paul, Minn.

Discussion. J. Berlingett, Assistant General Manager, Virginian Railway Company, Norfolk, Va.

Discussion. W. G. Secrest, General Yard Master, Wheeling & Lake Erie R. R., Cleveland, Ohio.

Thursday, October 19, 1916

TEXTILE SECTIONAL MEETING, 9:30 a. m. to 12 noon.

Chairman, W. C. Swallow, Amoskeag Manufacturing Company, Manchester, N. H. Vice Chairman, Henry A. Hale, Jr., manager, Bureau of Safety, American Mutual Liability Insurance Company, Boston, Mass. Secretary, Charles T. Miley, Carpenter Steel Company, Reading, Pa.

Report of Chairman.

Appointment of Nominating Committee.

"The Safety Work of the Ludlow Manufacturing Associates." B. B. Fogler, Chairman, Safety Committee, Ludlow Manufacturing Associates, Ludlow, Mass.

"Safety in Southern Cotton Mills." G. D. Bragdon, Supervisor of Inspectors, General Accident Fire & Life Assurance Company, Philadelphia, Pa.

Additional topics and speakers will be announced later.

Report of Nominating Committee and election of officers.

Thursday, October 19, 1916

AFTERNOON SESSION, 2 p. m. to 5 p. m.

Sectional Meetings:

Electric Street Railway Section.

Health Service Section.

Steam Railroad Section.

Thursday, October 19, 1916

ELECTRIC RAILWAY SECTIONAL MEETING (Continued) 2 p. m. to 5 p. m.

Fifteen Minute Discussions:

"The Application of the National Electric Safety Code to Electric Railway Construction and Operation." W. J. Canada, Electrical Engineer, Bureau of Standards, Washington, D. C.

"Safety Devices on Electric Street and Interurban Cars." Charles H. Cross, Secretary, Central Safety Committee, Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

"Warnings at Interurban and Obstructed Crossings."

"Hazards of Power Houses and Car Barns and Their Remedies."

"Methods of Instructing New Motormen in Their Duties." H. B. Adams, Safety Supervisor, Aurora, Elgin & Chicago Railway, Aurora, Ill.

Report of Nominating Committee and election of officers.

Thursday, October 19, 1916

HEALTH SERVICE SECTIONAL MEETING (Continued) 2 p. m. to 5 p. m.

Fifteen Minute Discussions:

Digitized by Google

"The Company Doctor." Dean Samuel S. Marquis, Department of Education, Ford Motor Company, Detroit, Mich.

Discussion. Mrs. Lillian Burt, American Issue Publishing Company, Columbus, O.

"Employment, Medical Supervision and Safety." L. A. Phelps, Superintendent, Insurance and Maintenance, The Avery Company, Peoria, Ill.

Discussion. J. H. Weller, Supervisor of Labor, Packard Motor Car Company, Detroit, Mich.

"Industrial Hospitals and Dispensaries." Dr. R. C. Cabot, Boston, Mass.

Discussion. Dr. T. R. Crowder, Chief Surgeon, The Pullman Company, Chicago.

Discussion. Dr. H. N. Torrey, Surgical Director, Michigan Workmen's Compensation Mutual Insurance Company, Detroit, Mich.

"Hernia." Dr. Jas. Burry, Chief Surgeon, Illinois Steel Company, Chicago.

Discussion. Dr. C. W. Hopkins, Chief Surgeon, Chicago & North Western Ry., Chicago.

"Dental Work in the Industries." Dr. Lee K. Frankel, Sixth Vice President, Metropolitan Life Insurance Company, New York City.

Discussion. Dr. C. E. Smith, Dental Clinician, B. F. Goodrich Company, Akron, Ohio.

Thursday, October 19, 1916

STEAM RAILROAD SECTIONAL MEETING (Continued) 2 p. m. to 5 p. m.

Fifteen Minute Discussions:

"How to Make Safety Committee Meetings Interesting." W. C. Wilson, Claims Attorney, Delaware, Lackawanna & Western Railway Company, New York.

Discussion. H. J. Bell, Safety Inspector, Chicago & North Western Ry., Chicago.

Discussion. R. S. Jarnagin, Safety Engineer, New York Central R. R., New York.

The National Safety Council—

(a) "What Service Does It Render Its Members and How Can That Service Be Improved?"

(b) "What It Is Doing for the Public." G. S. Locker, Safety Inspector, Duluth & Iron Range Railroad, Two Harbors, Minn.

Discussion. B. W. Horner, Claim Agent, Carolina, Clinchfield & Ohio Railway, Erwin, Tenn.

Discussion. W. H. Cameron, Secretary-Treasurer, National Safety Council, Chicago, Ill.

Report of Nominating Committee and election of officers.

Thursday, October 19, 1916

BANQUET.

Toastmaster, Arthur T. Morey, President, National Safety Council.

Speakers:

R. C. Richards, Chairman, Central Safety Committee, Chicago & North Western Railway, Chicago.

James Schermerhorn, Detroit *Times*, Detroit, Mich.

Franklin H. Wentworth, Secretary, National Fire Protection Association, Boston, Mass.

Friday, October 20, 1916

MORNING SESSION, 9:30 a. m. to 12 noon.

Sectional Meetings:

Cement Section.
Employes' Benefit Association Section.
Electrical Railway Section.
Governmental Section.
Iron and Steel Section.
Logging, Lumbering and Woodworking Section.
Paper and Pulp Manufacturers' Section.
Public Safety Section.

Friday, October 20, 1916

CEMENT SECTIONAL MEETING, 9:30 a. m. to 12 noon.

Chairman, G. S. Brown, President, Alpha Portland Cement Company, Easton, Pa. Chairman of the Committee on Accident Prevention and Insurance, Portland Cement Association, Chicago, Ill.

"What Has Been Accomplished by Cement Companies in Safety Work." Robert Brinton Hill, Manager, Bureau of Accident Prevention, Portland Cement Association, Chicago, Ill.

"Electrical Hazards." R. J. Young. Manager, Department of Safety and Relief, Universal Portland Cement Company, Chicago, Ill

"Safe Practices in Quarry and Mill."

General Round Table Discussion.

Friday, October 20, 1916

EMPLOYES' BENEFIT ASSOCIATION SECTIONAL MEETING 9:30 a. m. to 12 noon.

Chairman, J. M. Eaton, Superintendent, Cadillac Mutual Benefit Society of Cadillac Motor Car Company, Detroit, Mich.

"The Mutual Value to Employer and Employe of a Benefit Association." J. N. Redfern, Superintendent Relief Department, Chicago, Burlington & Quincy R. R. Company, Chicago.

"The Essential Features of Organizing Benefit Associations." W. L. Chandler, Assistant Treasurer, Dodge Manufacturing Company, Mishawaka, Ind.

"The Statistical Basis for Assessments and Benefits." J. M. Eaton, Cadillac Motor Car Company, Detroit, Mich.

"The Doctor's Work in a Benefit Association."

Friday, October 20, 1916

GOVERNMENTAL SECTIONAL MEETING, 9:30 a. m. to 12 noon.

Chairman, Lewis T. Bryant, Commissioner of Labor, State of New Jersey, Trenton, N. J. Vice Chairman, John R. Brownell, Director of Safety, Industrial Commission of California, San Francisco, Cal. Secretary, Lew R. Palmer, Chief Inspector, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.

Report of Chairman.
Report of Secretary.
Reports of Committees.
Appointment of Nominating Committee.

Digitized by Google

Fifteen Minute Discussions:

"Standardizing Accident Records." Royal Meeker, Commissioner of Labor Statistics, U. S. Bureau of Labor, Washington, D. C.

"The Accident Problem as It Concerns the General Public." Frederick L. Hoffman, Statistician, Prudential Life Insurance Company, Newark, N. J.

"Standardized Federal and State Safety Regulation." E. B. Rosa, Chief Physicist, Bureau of Standards, Department of Commerce, Washington, D. C.

Discussion. John Price Jackson, Commissioner, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.

Marine Safety Regulations.

Report of Nominating Committee and election of officers.

Friday, October 20, 1916

IRON AND STEEL SECTIONAL MEETING (Continued), 9:30 a. m. to 12 Noon.

Fifteen Minute Discussions:

"Safety in Rolling Mill Operations." Chas. R. Hook, General Superintendent, American Rolling Mill Company, Middletown, Ohio.

Discussion. P. R. Baker, Assistant General Superintendent, Lukens Iron & Steel Company, Coatesville, Pa.

"Electric Hazards." D. M. Petty, Superintendent of Electrical Department, Bethlehem Steel Company, South Bethlehem, Pa.

Discussion. S. C. Coey, Assistant Master Mechanic, Youngstown Sheet & Tube Company, Youngstown, Ohio.

"Safety in Coke Oven Operations." K. M. Burr, Safety Inspector, Illinois Steel Company, Gary, Ind.

General Discussion.

"Police and Fire." G. W. Atwood, Youngstown Sheet & Tube Company, Youngstown, O.

Report of Nominating Committee and election of officers.

Friday, October 20, 1916

LOGGING, LUMBERING AND WOODWORKING, SECTIONAL MEETING, 9:30 a. m. to 12 Noon.

Chairman, E. G. Prichett, Secretary, The Macey Company, Grand Rapids, Mich.

Addresses:

"Interesting the Manufacturer in Accident Prevention Work." F. D. Campau, Secretary, Furniture Manufacturers' Association, Grand Rapids, Mich.

"Possibilities of Preventing Accidents in Logging Camps Through Educational Means." J. J. Lingle, Manager, Westboro Lumber Company, Westboro, Wis.

"How to Organize a Saw Mill for Safety." F. A. Barker, Lumberman's Mutual Casualty Company, Chicago, Ill.

"Safeguarding the Most Hazardous Machines in Woodworking Plants." Henry Burr, T. M. Mastin & Co., Kansas City, Mo.

"Safe Practices in Lumber Yards." B. C. Christy, Chief Safety Inspector, International Harvester Company, Chicago, Ill.

Organization of Section and election of officers.

Friday, October 20, 1916

PAPER AND PULP MANUFACTURERS' SECTIONAL MEETING, 9:30 a. m. to 12 noon.

Fifteen Minute Discussions:

"Safety Committee Work in Paper Mills."

"Maintaining Interest in Safety Bulletin Boards."

"Safety in the Plants of the Ontario Pulp and Paper Manufacturers' Plants."

"Relation of the Eight Hour Day to Safety."

"Health and Surgical Problems of the Paper Industry."

Report of Nominating Committee and election of officers.

Friday, October 20, 1916

PUBLIC SAFETY SECTIONAL MEETING. A joint meeting with the members of the Electric Street Railway Section, 9:30 a. m. to 12 noon.

Chairman, Edward C. Spring, Assistant to President, Lehigh Valley Transit Company, Allentown, Pa. Vice Chairman, Robert W. Campbell, Chairman Central Safety Committee, Illinois Steel Company, Chicago.

Report of Chairman.

Appointment of Nominating Committee.

Fifteen Minute Discussions:

"Public Safety Work of Public Service Companies." H. A. Bullock, Chairman, Central Safety Committee, Brooklyn Rapid Transit Company, Brooklyn, N. Y.

"Ideal Organization for Public Safety in a Community." Robert W. Campbell, Chairman, Central Safety Committee, Illinois Steel Company, Chicago.

"Street Traffic Regulations as Related to Public Safety." Wm. P. Eno, International Traffic Expert, Saugatuck, Conn.

"Public Safety Education in the Public Schools." R. B. Morley, Secretary-Treasurer, Ontario Safety League, Toronto, Can.

"Practical Aspects of Public Safety Work." Dr. Wm. Burgess, Secretary, Public Safety Commission of Chicago and Cook County, Chicago, Ill.

Report of Nominating Committee and election of officers.

Friday, October 20, 1916

AFTERNOON SESSION, 2 p. m. to 5 p. m.

Sectional Meeting.

Health Service Section.

Friday, October 20, 1916

HEALTH SERVICE SECTIONAL MEETING (Continued), 2 p. m. to 5 p. m.

Four Round Table Meetings.

(Thirty minutes' discussion of each topic will follow the addresses. Each speaker will act as the leader of the discussion following his own address.)

"Relationship of Health to Industry." Dr. W. A. Evans, Chicago *Tribune*, Chicago, Ill.

"Medical Supervision of Workmen." Dr. Harry E. Mock, Chief Surgeon, Sears, Roebuck & Co., Chicago.

"Reduction of Health Hazards." Dr. Francis D. Patterson, Chief, Division of Hygiene

Digitized by Google

and Engineering, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.

"Standards of Industrial Hygiene." Dr. J. W. Schereschewsky, U. S. Public Health Service, Pittsburgh, Pa.

Report of Nominating Committee and election of officers.

Friday, October 20, 1916

INTERSTATE FIRST AID CONTEST.
2 p. m. to 5 p. m.

Arrangements are being made under the auspices of the Mining Sectional Executive Committee of the National Safety Council for contests of First Aid Teams to be sent to Detroit by the mining members of the Council.

Demonstrations of mine rescue work, explosibility of coal dust and flour will also be included in the program.

Prizes and medals will be awarded.

SAFETY EXHIBIT.

One of the new special features of the Congress will be the Commercial Safety Device Exhibit. The Executive Committee of the Council decided that a comprehensive Safety Device Exhibit would have an immense educational value. Messrs. Hoyt & Hall, of Chicago, who have a national reputation as exhibit managers, are under contract to manage the business arrangements. Fifteen thousand square feet of space have been rented in the Armory at Detroit. The greater part of this space has been sold to Commercial Safety Device Companies, and to industrial concerns and railroads, who will exhibit the latest improvements in Safety Devices for the benefit of members of the Council.

The Council's own Educational Safety Exhibit will emphasize upon Industrial Sanitation and the progress being made by its fifteen sectional organizations in solving their safety problems.

The Exhibit Hall will be open from 3 p. m. to 11 p. m., commencing Monday, October 16, and ending Friday, October 20. The Exhibition will not interfere with the conferences or meetings, but there will be ample opportunity for every attendant at the Congress to get the full value of the Exhibit. Be sure to visit it.

Special exhibitions of First Aid teams will be given at 3 and 8 p. m. each day.

Music by Ford Motor Company and Packard Motor Car Company Employes' Bands.

Novel "Safety First" Machine

AT a recent fair held in Topeka, Kan., the State labor department exhibited a new "Safety First" machine, designed by B. G. Baird, a deputy factory inspector belonging to the labor department, and A. Alden Knapp, chief clerk in the department. It is a box-like affair in which mechanical apparatus is arranged which continuously turns page after page containing data on the subject of "Safety First." The pages remain in position long enough for persons to read the print or inspect the pictures closely. The text will contain information as to health conservation and the avoidance of accidents. Above the moving pages are an electric light and a bell. The light is timed to flash every 15 seconds, indicating that at each flash a serious accident has occurred somewhere in the United States. The bell will ring every 7 minutes to show that some industrial worker has lost his life.

It is the intention of the Kansas labor department to show the machine at fairs and similar events throughout the State.

Fire and Accident Prevention Day

THE National Fire Protection Association and the National Safety Council, the leading American organizations striving to eliminate common fire and accident hazards from the United States and Canada, are uniting this year in urging the nation-wide observance of Fire and Accident Prevention Day on October 9, the anniversary of the great Chicago fire. An attractive poster has been designed and suggested programs for observance of the day worked out which are being distributed to the civic and commercial organizations of the country. The national and dominion associations of fire chiefs, fire marshals and credit men are co-operating. While sporadic observances of fire prevention day have heretofore been held in certain States and cities, this is the first organized attempt to promote its general observance throughout North America.

Digitized by Google

The Man On The Job

Prevention of Accidents by Education of Workmen, Methods of Management and Mechanical Safeguards

SAFETY ENGINEERING offers each month one First Prize of $10.00 *and one Second Prize of* $5.00 *for Articles relating to Industrial Accident Prevention. In case of a tie, the full amount of the prize will be paid to each tied contestant.*

No. 238 ALL INDUSTRIES—INTERESTING THE MAN HIGHER UP.—Who is the man that decides whether or not a plant shall be equipped with modern safety appliances, the workman guarded at his work; in short, whether "Safety First" shall be a part of the regular operating plan? It is not the laborer, nor the foreman who, be they never so interested, are powerless to initiate reforms, which may mean radical rearrangement and the expenditure of considerable sums, unless the employer, the man higher up, is first convinced of a need for improvement.

Recognizing then that the success of safety work, its future, depends upon the attitude of those who control our industries, does it not behoove those of us who are in this work to see to it that they are educated in safety ideas and to study the facts in order to be able to present our case in a way that will make them interested?

Easiest to approach, and convince, are those who take real pride in the management of their plants and have a genuine interest in the welfare of their employes. Such men, once properly shown the advantages of being safe, are ready to make all reasonable improvements. Next come those who feel that whatever improvement is made should be more or less evenly balanced by the financial return. Finally in the third and last class are the men that are unwilling to install any safeguard unless shown an actual cash profit on this account. The health and welfare of the employe are not considered. The man who, having had good "experience," is inclined to discount the past against the future also belongs here.

The old saying "nothing succeeds like success" has found wide favor, but to those of us who have had occasion to note the extra hazardous conditions existing in some plants where, fortunately, the experience has been good, "nothing succeeds like luck" comes home with more force. Certainly nothing is more calculated to dull a man's appreciation of dangers existing as a menace to his workmen than a few lucky years without a serious accident.

It is this third class of employer which demands the most attention from us who are interested in safety work The arguments we use must be presented on a strictly business basis. Just as the manufacturer educates the public to the need for his goods and their utility, so must those whose lives are devoted to safety work for the benefit of their fellows see to it that their clients, the manufacturing and big business men, as well as the general public, are educated up to the purpose and ideals of safety work. The purpose which we must have in mind is to demonstrate that plant organization, safe, light buildings, guarded machines and contented workers are just as surely business assets as are good will and reputation which are now generally recognized as important items on any balance sheet.

When we have convinced the employer of these facts we have educated him out of the third class and have brought him to the point where he can appreciate what we recognize as the justification and reward of our efforts for "Safety First."

❦ ❦ ❦

No. 239 VARIOUS INDUSTRIES—DOES THE MAN ON THE JOB KNOW WHEN UNSAFE CONDITIONS EXIST IN HIS PLANT?—By installing safety devices and guards; by intelligent enforcement of shop rules; by the em-

Digitized by Google

ployment of labor as physically fit as can be secured; by placing the active and efficient man at labor on the hazardous work; by eliminating intoxicating liquors from the plant; by reasonable hours of employment in well lighted, well ventilated plants under sanitary conditions, we know that many accidents can be avoided and sickness and loss of time overcome.

We have learned all this from experience and can say we *know*. But do we know that The Man on the Job is as efficient or as capable as such a man should be? Only too frequently he is not.

Every article written on the subject of safety must necessarily contain reference to co-operation; safeguards; effective methods; employment of sufficiently trained men; inflexible rules; placing the blame, and education. To my mind the last is the key to the entire situation.

It is an indisputable fact that the world owes all to education. With it any possible, and some seemingly impossible, achievements may be accomplished. Without it man is lost. The beauty of safety education lies in the fact that it is so easily obtained. It requires no burning of the midnight oil. Reading? Yes, and a lot of it, but the essential quality of safety education is an understanding of ethics.

It is an expensive undertaking to protect the workman from injury, either from his own or co-workers' carelessness or from physical hazards in the plant. The better to accomplish the work many plants of sufficient magnitude to warrant such action have engaged the services of specially trained safety engineers. I have neither such plants nor such engineers in mind.

But of The Man On The Job, who has worked up from the ranks and owes his present position to his general usefulness to the company, his knowledge of the plant, its equipment and output, I would ask the question at the head of this article.

Do you know of the unsafe conditions existing in your plant? If not, why not?

1. Because The Man On The Job seldom takes the time or has not the inclination to make a careful study of working conditions.

2. If he studies conditions at all, he invariably confines his efforts to equipment.

3. He fails to study the men working under his supervision for the same reason as set forth in number one.

4. He either will not or cannot assimilate the idea of safety in everything as well as "Safety First" in some things.

The remedy is safety education, and The Man On the Job can educate himself. It should not require the services of a trained safety inspector to survey the plant and point out to him holes in floors, defective ladders, stairways, windows, fire-escapes, exits and platforms, unguarded machines and unsafe elevators, broken gates and lockless doors, exposed set screws, dangerous joints on shafting and unguarded belts, blocked passageways and insufficient light. These and many other defects could be discovered by him and corrected. In so doing he will have taken steps in the right direction. He does not discover them, however. The defects are not brought to light until some inspector, State or casualty, calls attention to them.

Steel Casting Plant.—Recently I made an inspection of a steel casting plant and suggested to the superintendent that it might be a good idea for him to test the automatic stops of the five cranes after the draw that night, so that if anything was out of order he would have time to make adjustments before I inspected them on the following day. Evidently he was perfectly confident that the cranes were in good condition as he had considered it unnecessary to make the test as I had suggested. I found the automatic stops on three of the cranes entirely inoperative and the stop on a fourth operated on the *down* motion. Did that Man On The Job know of such an unsafe condition?

Slack Cable Devices "Frozen."—At another plant I found the slack cable devices (in this case they were crosshead switches) on the three-passenger elevators "frozen." The entire interior of the building was painted with white enamel, including the elevator cabs, and the switches mentioned were so heavily coated that it was necessary to break them loose with a hammer. The Man

Digitized by Google

On The Job was quite "peeved" when he saw me using a hammer on his beautiful paint. When questioned, he admitted that he had often noticed that little device, but did not know what it was for.

LEATHER PLANT.—In a large leather manufacturing plant I found that the fleshing machines were being operated without guards. The machines were properly guarded when built and were delivered at the plant in a "knocked down" condition. When set up, the Man On The Job could find no place for the guards to fit, so they were left off. I recommended that the guards be installed, made a re-inspection in ten days, found that the guards were still in storage, and advised the carrying company to cancel, which it did. Two months later a man lost three fingers on one of those machines. Did The Man On The Job realize the unsafe condition?

There is a case on record in one State (printed in pamphlet form, together with 12 other cases as, "Thirteen Accidents Which Could Have Been Avoided") wherein two men were seriously injured by the same operation, on the same machine, in the same manner after The Man On The Job had been slightly injured himself in like manner. When questioned, The Man On The Job said he "did not realize"!

An extract from the files of the Industrial Commission of Wisconsin:

"In making an inspection of one plant a deputy of the State found an unguarded set screw on a shaft 14 feet from the floor. The attention of The Man On The Job was called to it, and he was urged to guard it. He protested, writing the following letter:

"'Your deputy has requested me to guard a set screw, on a line shaft 14 feet from the floor, where no one has ever been since the shafting was placed there 13 years ago, and where no one ever will go should it remain there a thousand years. If you cannot send any better inspectors around the State than this one, the quicker your commission is abolished the better.' Shortly afterwards, an employe in the plant was caught on that identical set screw and was torn to pieces."

Did that Man On The Job realize the unsafe condition? No, not even after the danger was pointed out to him.

What is the answer? What remedy can be administered to cure this "I-didn't-know-it-was-loaded" disease? Education!

In my "kit" I have dozens of clippings, cut from the pages of safety periodicals, which I find to be a wonderful aid in demonstrating safe and unsafe conditions.

The man who said, "You can't teach an old dog new tricks," was talking about *dogs,* not *men.* If a man is willing to learn, and has a grain of common sense he can learn a great deal about "Safety First."

I would like to put on record the experience of a plant that I inspected about two years ago. Up to that time the plant had never been inspected by a representative of a casualty company. The carrying company, which had been on the risk but a short time, had decided to cancel unless marked improvement could be shown within 30 days. Needless to say, I found the equipment and working conditions deplorable. However, I found one redeeming feature in the person of The Man On The Job. He was alive to the safety idea, but never having had charge of a plant before, with no training in safety work, he was at sea as to how and where to begin. Now this plant, at the time of which I am speaking, had on an average of seven accidents per day.

It is a 24-hour plant, and in order to observe all shifts, I spent two days and one night studying conditions and making suggestions for improvements. Before leaving the plant the management had agreed to close down for two hours, between shifts, in order that both day and night crews might attend the first safety meeting. As is customary in such meetings, the men were invited to ask any question that they had in mind. The most important question asked was, "What can I do?" The accident files containing all data of injuries, which had occurred at the plant within the last year, were referred to and many cases, their cause and effect, were read. The men were asked if they thought any of

Digitized by Google

the accidents could have been avoided by their personal endeavors.

Within the 30 days set by the carrying company as a limit for improvement, the management had spent something over $1,500 for guards and repairs; a good working safety committee had been organized, daily meetings had been held for that period; three shifts had been inaugurated in the 24-hour departments, and the accident list had been cut to 12 for the 30 days.

Here was a Man On The Job who was not only willing, but anxious to learn when unsafe conditions existed so that he might eradicate them.

Co-operation must of necessity enter largely into the relations between the management and the men to gain results.

It is a well known fact that up to the present time the workman has shown but little interest in the efforts that have been made in his behalf along safety lines. However, the superintendent must know how to approach his men and educate them that they may realize that the safety work being carried on is for their good as well as for the good of the company. Safety committees are a great institution and have proven a wonderful asset in reducing accidents, but once more I find The Man On The Job has fallen down. One of the largest plants in the Northwest had a good safety committee which disbanded for the reason that they could find no further defects in the plant. The Man On The Job agreed with them. Our inspection of the premises disclosed more than 100 violations of the State laws, and many defects that any casualty inspector would require corrected before advising his company that it was a good risk. In this case as in the others, The Man On The Job did not know of the adverse conditions.

Therefore The Man On The Job must educate himself to all dangerous conditions in his plant, and endeavor to be the first as well as the last word in "Safety First."

❦ ❦ ❦

No. 240 ALL INDUSTRIES—EFFECTIVE SAFETY WORK.—Accident prevention, in my opinion, has now reached the stage where most progress can be made by the safety engineer or safety organization in the plant.

Guards for most hazardous points: gears, belts, chains, platforms, runways, electrical and explosive hazards, have been developed and are so widely known that they are easily procurable or can be made in the plant.

It is now for the safety organization to educate both employer and employe to the absolute necessity for the proper use of these guards and for them to conform with rules and regulations for safe handling of explosives, electrical apparatus and, I might add, heavy material.

In too many instances the employer is satisfied with the mere putting on of standard or sub-standard guards and letting it go at that.

It is for the safety man to impress upon him that no satisfactory results are to be obtained by this means. The guards must be kept in place and also in good condition to produce results.

The employe, not seeing his superiors interested in safety work, takes no interest himself and in many cases pays an awful penalty for his lack of interest.

If the owner, superintendent, foreman and gang boss are held accountable for each and every accident, both as to cause and prevention, our yearly toll of casualties would be greatly reduced.

In many States safety organizations are required by the rating boards to affect the rate favorably for liability and compensation insurance.

Let the men comprising these organizations show the value of their appointment and make the slogan "Safety First" a live one, productive of results for the employes' welfare and happiness, for employers' output and humane feelings for the benefit of the employes' family and dependents.

❦ ❦ ❦

No. 241 ALL INDUSTRIES—BROADENING THE INSPECTOR.—The factory inspector has an important place in the industrial world of today. Making, as he does, surveys of industrial plants for compensation insurance rate determination and for purposes of offering recommendations for safe-

Digitized by Google

guards and improvements, his duties are not unlike those of the consulting engineer. He must, therefore, approach in his training the same characteristics which are possessed by that profession. In other words, he must be broad in his capacity for analyzing the conditions which confront him to determine their bearing upon the problem involved.

Considerable criticism is voiced against factory operators by inspectors because of the lack of sympathy for the safety movement which has seemed to characterize the attitude of many of them toward the inspectors. However, I firmly believe that much of this controversy is not due to the indifference of the owner so much as to the under importance that has been placed upon some minor elements of accident prevention and the disregard of some of the most vital ones. I have made several factory surveys for rating purposes, in which some member of the management would accompany me. Frequently he would appear to believe that the only features of the factory which I cared to note were the machines. It was evident that the belief was due to the fact that this particular phase of accident prevention had been stressed to the exclusion of all others by former inspectors. Any factory owner knows well that machine guarding is only a minor element of accident prevention. Other features, such as light, order, carelessness, etc., have a greater bearing. It is evident, therefore, that he will not show any particular sympathy for a movement which he recognizes as improperly emphasized in some of its phases.

My purpose is not to dwell upon the relative values of the various elements of accident prevention, but rather to illustrate an essential of the successful factory inspector. That essential is a breadth of understanding of his work which takes him beyond the book of standard safeguards and the inspector's report blank into every phase of the industrial plant. This cannot be attained by mere repetition of inspections day after day. It must be the result of broad and careful study of all available literature upon every phase of factory operation. Much attention should be given to works on factory management. Why not acquaint ourselves with the viewpoint of the management of the factory by being able to talk intelligently upon the recognized essentials of factory operation? We will find our task of propagating the safety movement much easier if we understand the owner's viewpoint. When we attempt to make a survey for rating purposes or make recommendations for improvements which may affect the very policy of the management, are we not treading on dangerous ground if we do not understand the fundamentals of factory management? Let us avoid such conditions and inspire the confidence of the factory owner in our work.

What of the conditions which promote efficiency in the industrial plant? One of the favorite arguments in the safety movement is that safety means efficiency. Do we study the efficiency question as we ought? How about the conditions of employment and labor? Are we studying their effect upon accident prevention?

These are some of the things regarding factories which we ought to study in order that we may learn to look upon a factory as a whole and recognize the bearing of all conditions upon the accident hazard. Let us not dabble with only the superficial elements of industrial safety, but rather let us look deep into the causes of the vast numbers of accidents and determine the bearing of each phase of the industrial plant upon the safety of its employes. This would mean greater sympathy for our efforts and a greater establishment of our work as a vital factor of the industrial world.

In studying we should not confine ourselves to those works which have for their purpose the promotion of the safety movement. Let us study the industrial plant from all viewpoints. We need not fear being too broad in our understanding of our work, but we should fear narrowness with all its evil results. Let us not forget that new plans and ideas are always welcome in any great movement and that The Man On The Job is in an excellent position to lend new ideas and develop new plans if he writes his experience with the results of careful study.

Digitized by Google

No. 242 ALL INDUSTRIES—THE CAMERA IN SAFETY WORK.—Have my fellow safety inspectors noticed what a wonderful part a little camera can play in the educational phase of the safety movement?

Some time ago the writer in traveling through the plant, bent upon securing a picture of a dangerous condition which had been under discussion by a safety committee, espied a mechanical safeguard out of place, and which had apparently been stored away for some time under the machine, "temporarily to make repairs." The camera was instantly focused upon the situation, including the operator of the machine, the man responsible for the violation of the safety rules. A few hours afterward this "close-up" photograph was placed upon the bulletin board in this department. Can you imagine what an effect it had? Especially upon the fellow "caught with the goods." Other incidents were the "snapping" of two fellows indulging in a bit of horseplay; workman using a condemned ladder; grinding without wearing goggles; careless practices around hot metals, and several others of the many thoughtless and chance-taking stunts we all see and hear about. In no instance was there any written comment placed upon the photograph. The picture told the tale.

The little pocket camera, therefore, has become a valuable acquisition to the safety department. It is seldom out of the inspector's pocket as he goes through the plant, and as you may suppose, the "settings" are getting fewer each day. No workman cares to be caught "pulling a bone play," so he is on the alert for the "camera safety inspector."

Prizes for August Articles

First Prize. No. 234. W. P. Strickland, General Inspector, New York & Queens Electric Light & Power Company, Long Island City, N. Y.

Second Prize. No. 237. Adrian W. McCoy, Inspector, Department of Labor & Industry, Meadville, Pa.

Honorable Mention. No. 233. Matt Louy, Chief Instructor, Toledo Railways & Light Company, Toledo, Ohio.

Other meritorious articles were contributed by F. M. Beamer, Superintendent, Elevator Inspection Department, United States Fidelity & Guaranty Company, Baltimore, Md.; E. C. Luster, Safety Engineer, General Accident, Fire & Life Assurance Corporation, Limited, Boston, Mass.; J. C. Smith, Safety Director, Inland Steel Company, Indiana Harbor, Ind.

Comments by Members of the Committee

I cast my vote for No. 237 for first prize and for No. 232 for second prize. I favor No. 237 because there can never be too much haste in beginning to safeguard. I favor No. 232 because I am of the same opinion as to the overlooking of small accidents.

Article No. 237 appeals to me. It shows how safety has been established and should be recognized and maintained, by The Man On The Job. It shows that many regard safety as a joke and do not take proper care. By proper supervision they are compelled to pay attention to safety precautions. It points to the fact that when safeguards have been removed or improperly made, they can be adjusted by the operator of machines.

After carefully reading No. 236 I have come to the conclusion that the author brings out a point which has

Digitized by Google

frequently occurred to me. Of course it is about the only hazard incident to a plunger elevator, but nevertheless it is quite a serious proposition.. I have never heard of a plunger breaking loose, but I can readily see that such a thing is not only possible but probable. I therefore consider this article as valuable as any published in SAFETY ENGINEERING for August.

I believe No. 236 is entitled to first prize, as it is a contribution to this department and should lead to something greater in that line. Will some reader answer the last paragraph of the article?

I vote for No. 236 because it opens a line of argument on a subject regarding which considerable diversity of opinion exists, also ignorance of the real "why and wherefore." The brother with the imaginative mind should be given more light on his questions which doubtless many of the readers of SAFETY ENGINEERING will be able and willing to supply.

I do not consider No. 236 the best article from the usual point of view; but to my mind the article opens a new line of thought for those connected with safety work. I would like to see the article criticised by SAFETY ENGINEERING'S constituents. That may be an inducement to SAFETY ENGINEERING to broaden its usefulness by opening up a "question and answer" department.

No. 235 is a plea for constructive methods and if all the suggestions outlined were conscientiously carried out there would be little else necessary for conducting a successful campaign where there is a safety organization.

No. 237 should receive the first prize. Other articles are just as ably written and as carefully considered, but admitting such equality, there is one sentence in No. 237 that is a sermon in itself: "How many of the presidents, managers, or general superintendents who read this know that recommended safety work is done and done right?" It being the purpose of "The Man On The Job" articles to start people to thinking, here is a thought worth while.

My choice for first prize is No. 237. In my opinion the writer of this article hits the nail more squarely on the head than any of the other writers in the August issue. No. 232 possesses good features. In work such as we are engaged in, it will always be a matter of opinion as to when the safeguard for a certain machine or condition is adequate. I believe that if those engaged in safety work would interest themselves in the appointment of State factory inspectors and laws relative thereto, we should get a long way toward eliminating just such a condition as the writer of No. 232 brings out.

One of the best inspectors that I have ever known, recently applied to the chief State factory inspector for information relative to a position with the State. Almost the first question asked him was: "How many votes do you control?" In other words it is not efficiency that our State bureaus wish but "soft jobs." If you will investigate the experience of most of our State factory inspectors, you will find that a very large percentage of them really have no experience in factory work. In fact, in one State, some time back (I don't know whether it has since been changed) for State factory inspectors, there were a steam fitter, a cigar maker and an undertaker. A good combination!

The writer of No. 232 states that what is really needed in the different States are laws for safeguarding industrial workers, and the enforcement of such laws by men qualified for the purpose, by their technical knowledge. My opinion is, that it is not the making of laws but the enforcement of them; not the drawing up of laws by technical men but by practical men.

Digitized by Google

My experience has been that in 9 cases out of 10, those inspectors having technical training must first, when coming into the operative world, have about 99 per cent of technique removed from their brains and practical knowledge installed. It must always be taken into consideration that every plant is not the same size, nor has it the same machinery, nor are the operations carried on in the same manner. Neither have all plants the capital to go ahead and comply with laws and recommendations, as they probably would wish.

A little more attention should be paid to the laws regarding the building of the machinery and it should first pass, we will say, the board of underwriters.

No. 233 makes a good point in showing that the employer should blaze the way, so to say, for those under him so that they may all realize the responsibility that rests upon them.

No. 235 is good for a large plant, but it must be remembered that where there is one plant having 3,500 men, there are 100 plants having less than 50 men, and it is the small plant on which the hardship falls.

No. 236 is good and I am indeed glad to see that the columns of SAFETY ENGINEERING are being used for the asking of questions. For the benefit of the writer of the article, I would say, as one having considerable experience with elevators, both in their building and installation, that the condition he brings up is a possibility but the chance of an accident of this kind happening is very remote. In all my experience I have never heard of an accident due to this cause.

Regarding air in the cylinder of a plunger type elevator, I have never heard of that condition. As stated before, the chances of an accident of that kind are so remote that it is hardly worth while, in my opinion, bothering with it.

No. 237 is well written and should have first place. One of the greatest aids to safety work is to have it done properly and promptly.

I think everyone has experienced difficulty in getting men to take an interest in the safety movement and learn the safety rules. No. 235 outlines a campaign which should be a great help in stirring up interest. His article is entitled to first prize.

I vote for No. 234 because the article is short and straight to the point. "Habits of thought," if the thought is correct, help a man a lot. I had a similar experience to that described in the article.

I have selected No. 235 for first prize, as I think its merits are a shade better than the others. The writer has no doubt been a valuable servant in the "Safety First" cause. The prize system which he has been so successfully using as a means of encouraging co-operation, is well worth close attention by all safety workers. I am a firm believer in giving prizes for stimulating greater activity, when properly handled. This course has been followed with great success throughout the various plants in which I have been interested, and I wish to commend the article to all readers of your useful magazine.

Digitized by Google

The Fight Against Fire

Conservation of Life and Property by Safe Construction, Fire Prevention Methods and Fire Protection

SAFETY ENGINEERING offers each month one First Prize of $10.00 *and one Second Prize of* $5.00 *for Articles, Suggestions, etc., relating to Safe Construction, Fire Prevention and Fire Extinguishment. In case of a tie, the full amount of the prize will be paid to each tied contestant.*

No. 112 FACTORY BUILDINGS — IMPROVING AND SAFEGUARDING EXTERIOR FIRE ESCAPES.—Up-to-date fireproof factory buildings, as a general rule, are provided with fireproof stair towers, located at intervals prescribed by law to accommodate the number of employes on the various floors. This type of construction makes it perfectly safe for the employes to descend in case of fire.

On old type factory buildings however, which are equipped with exterior fire escapes, the matter of safety in time of fire is entirely disregarded. These fire escapes, while constructed of steel and designed in accordance with building laws to support a prescribed safe load, are safe only when no fire prevails.

Records of numerous factory fires show that in many cases, persons intending to descend from the upper floors, were burned and charred before reaching the ground, thereby blocking the exit to others.

This is usually due to flames reaching up from the lower floors.

Fire escapes of the later type are a menace and a danger, not a measure of safety. With slight modifications, however, then can be made safe and I will try to tell how this can be done.

The bottoms of fire escape stairs and landing platforms are to be covered with ¼-inch asbestos boards bolted to steel work.

All stairs and landing platforms where not against walls, i. e., fireproof walls of building, should be enclosed on all sides, outside of hand railings, with ¼-inch asbestos boards, reaching a height of not less than six feet, measured vertically from stairs and platforms. Asbestos boards shall be properly bolted and braced on top.

Asbestos boards on bottom as well as on sides shall be bolted, and joints must be covered with asbestos cement. They should be bolted to steel work in such manner that a clearance of one inch is maintained between asbestos boards and steel work.

This is to permit a circulation of air around steel work, should the asbestos boards become heated to such an extent that it may cause the steel to buckle.

All windows in a building wall located under a fire escape, but not used as an exit, shall be closed with solid steel sash glazed with wire glass. By solid sash is meant sash without ventilators or other openings.

Any openings in such windows, if used for ventilating or other purposes, are in danger of being left open during the excitement of a fire, thus allowing flames free access to the fire escapes above them.

The additions described above, regarding exterior fire escapes already installed i. e. erected, will make them *safe*. Aside from drilling holes for the bolts to secure the asbestos boards and a few extra brackets and braces to support the additional weight, no changes are necessary.

With these improvements, descending employes are in no danger of being scorched by sweeping flames from the sides or below and they will not become panic stricken. From the fact that the view is shut off from them, there will be less excitement among the descending occupants of the building.

Digitized by Google

No. 113 VARIOUS BUILDINGS — DEFECTIVE CHIMNEY FLUES AND THE INDIFFERENCE OF OWNERS THERETO.—In the fall, about the time that the cold weather starts, the number of fires always appreciably increases. This is due in a large number of cases to defective heating apparatus. Fires caused by defective flues are preventable. Everyone ought to learn the main factors contributing to safe flue construction. These are designed to make the smoke, flame, heat and gases go into the open air through the top of the chimney rather than into the building through its sides.

Because fires from defective flues start under floors, in hanging ceilings, behind wainscoting, and in other places not in plain view, it does not follow that there is anything mysterious about them or anything which cannot be readily understood. If your house is old and you are not sure that the chimneys are safe, put your hand on the plaster covering the flue. If you can feel an appreciable amount of heat, there is probably no lining in the flue and the brickwork is not of the proper thickness. Have the chimney examined by an expert. Perhaps it is dangerous. A small piece of flooring taken up close to the flue will show at once whether or not the beams have been properly trimmed away. The flue can be lined by cutting out the brick front and inserting terra cotta flue lining. Or if the flue is straight enough, iron pipe can be dropped down the flue in sections and a thin grout of liquid cement run down between the lining and the brickwork to securely anchor it.

Many fires originate at the point where the stovepipe enters the flue. False furring to secure an imposing chimney breast is placed about the brick chimney and wood lath used for plastering. Since stovepipes or other heating devices should never be allowed to come in contact with combustible material the wood lath should be removed for at least 6 inches from the stovepipe and the space filled in with mortar.

These are common defects that any householder should be able to detect, and together with seeing that all flues are clean and free from soot, should be looked after before any fires are started in the fall.

The average owner when served with a notice from the officials in charge, stating that the heating apparatus is defective, seems to show a spirit of hostility not realizing that it is for his own benefit that the condition is brought to his notice. Never having had a fire he cannot see the dangers which exist and are apparent to the trained fire prevention inspector. This spirit of hostility is more often found in dwelling houses than in manufacturing buildings.

With a fire loss of many millions of dollars per year, and 85 per cent of it attributed to carelessness, it can be readily seen that with a little co-operation on the part of the public, this loss could be greatly reduced.

A small pamphlet distributed to the public giving the number of fires, their causes and the large amount due to defective heating apparatus, would go far toward overcoming the average feeling of hostility. Legislation could also be enacted allowing the insurance companies to withhold payments on policies where the owner had been informed of defects in heating equipment and had neglected to remedy them, if the fire was traced to this cause.

Of course there are laws compelling the observance of an official notice of defects in heating apparatus but magistrates, through a mistaken idea that a man's home is his castle, often sympathize with the owner, making the enforcement difficult unless the defect is glaring. But touch the owner in his pocketbook, which would be the case if his insurance were endangered, and he would act at once.

Summing up: If the owner or tenant of every dwelling or business establishment would have his chimneys examined at the approach of cold weather by a fire prevention inspector or chimney expert, arranging to have the flues put in first class condition, the resultant safety would more than compensate for the expense.

❦ ❦ ❦

No. 114 MORAL HAZARD.—In SAFETY ENGINEERING, for March, 1916, under the head of "The

Digitized by Google

Fight Against Fire," No. 97 says "Insurance Companies use the term 'moral hazard,' meaning the high risk from hired incendiarism."

I beg leave to say, therefore, that "moral hazard" consists of more than that although the principal basis of it undoubtedly is "poor business," or a belief that by going to some other location business would be much better.

If a policyholder has suffered by fire and the adjustment record shows that he has used all sorts of schemes in an endeavor to realize more than his actual loss; if the building owned or occupied by an assured stands on ground directly in the line of extensive improvements as, for instance, extensive railway terminal facilities; if it is positively established that the assured has become chronically slow in meeting his obligations or his creditors have to a great extent been obliged to use legal methods to enforce payment; all these things indicate a greater or less degree of moral hazard that should be taken into account by the insurance companies.

There is the fellow who persists in dumping his ashes close to the rear of his building, and (perhaps) praying that the retained heat will "get busy" during the night and put him in line to "realize."

To my mind he and rubbishy housekeepers should properly be charged with "moral hazard" and treated accordingly.

❦ ❦ ❦

No. 115 FIRE WALLS.—A "fire wall" is a wall designed to prevent or impede the progress of fire. Everybody knows that much.

If, however, you inquire a little further you will run up against a variety of "understandings" that nearly passes comprehension. That is if you attempt to discover what is a fire wall, not its use but construction. The ultra protectionist will insist that the term should apply only to a solid brick wall carried above the roof to form a parapet of considerable height. Others will permit some openings if protected according to their idea of proper protection. And so it grades down until at the other extreme the name is given to a partition of unpainted ⅞-inch pine boards.

Do not gasp at the heresy; a single board partition does possess some power of resistance if but temporary. Exactly such a partition painted with cold water paint has been known to arrest the progress of a considerable conflagration.

Of course, all this only means that there is a confusion, not of tongues but of terms, and persons in general have not learned, nor been taught, to discriminate between a fireproof wall and a fire retarding partition to the extent of expressing their meaning in precise terms.

Possibly the "ultra" definition is not quite as precise as it is intended to be, and there is ground at least for suspicion that we may have made a fetich of the parapet to the extent of creating stumbling blocks in several directions.

As between shingle roofs the need of parapets is not open to question. But alas! here the conservative side is uppermost, for while there may be exceptions in regard to other roofings a parapet of one foot or even six feet appears ridiculously inadequate. The only valid objection to carrying it up to an adequate height being expense (which ought not to count as against the "economy" of shingles) unsightliness (urged against *all* parapets) and the fact that it would beyond a certain height cease to afford a working shelter for firemen on the other side.

On the other hand, if one takes a couple of bricks and places them one upon the other so that the upper surface is the flat side 4 inches by 8 inches, and across them places a strip of any good asphalt felt roofing (it will be necessary to weight a strip of the size required, 8x12 inches, at the center to make it lie flat, and then builds a smart little fire on one side, it will be found that the roofing will consume over the flame, but it will be difficult to induce the combustion to continue across the four inches of brick, or even more than a moderate fraction of the distance.

If one will then repeat the experiment with a ⅞-inch board laid across the brick, one will find little difficulty in inducing the board to burn across and of course the roofing with it.

I have before me the building laws of several cities in all of which exceptions

Digitized by Google

are made as to parapet requirements in favor of certain buildings of three stories or under, in which case walls carried up to the bottom of the roof boards are accepted.

The chief reason for this exemption is the objection to parapets as unsightly, a secondary reason, expense. The first has some validity in fire department towns *if a prohibition of wooden shingles could go with it,* that is for all roofs *except* shingle roofs. As a matter of fact they are unsightly.

On the other hand the wall should *not* terminate at the *"under side of the roof boards."* That it should not is perfectly well known in all probability to every architect and builder at whose behest the modification was made, no matter how persistently they may deny it, for in fact such denial is the only course open to them.

Another law couples the exemption with the provision that the wall shall be carried up to the roof *covering,* "which may be continuous." It further provides that in every such case "four inches or more of brick shall intervene between the ends or edges of the roof boards."

This forms a really efficient division wall over which fire will not ordinarily pass, provided of course some water is thrown. It is in effect a parapet for, in low structures of ordinary occupancy and under three stories, the chief function of a low parapet is only to bear testimony that there is a brick division between the roof boards (always, however, excepting shingle roofs).

This can be arranged easily, either by ledging or corbeling the wall at the proper height, or, where bearing joists are bolted to the wall by dropping them ⅞-inch below the top and laying a broad strip of metal across the top under the roof covering.

It requires very brief consideration to establish the propriety of this restriction of the privilege of avoiding parapets.

Possibly building inspectors and others whose duty it often is to determine the presence or absence of a brick wall after "covering in" will endorse this as affording them means of proof without destroying finish.

This especially applies to outer walls on the drainage side having no projecting eaves.

Fire from exposures in these cases is in nearly every case communicated to the exposed ends of the roof boards.

If such walls (and end walls in special cases) be rebated ⅞-inch, and the roof boards dropped into the rebate, leaving the ends protected by four inches or more of brick, and the flushing is carried over the edge of the wall and a foot or more back under the roof, the full effect of a parapet is secured where an actual parapet is impracticable.

There is little chance of any ordinary roof covering igniting from exposure at a distance of 12 inches or more from the edge of the roof because the trend of heat currents is upward (aided by the deflection of the wall) and because at either side of the vertical, such currents are cooled by expansion.

The non-parapet wall is here to stay. Not necessarily the non-parapet wall as now generally permitted, as probably proper efforts will bring about some correction. Such walls, if constructed as suggested, might be classified as "fireproof" walls, but not if the roof *boards* are continuous. All others should, I think, be called partitions rather than walls.

A recent list furnished to a large corporation classified these as follows:

1. Brick or concrete, 12 inches thick or more, rising above roof and with no openings or with standard protected openings.
2. Brick walls like above, cutting roof boards but not rising above.
3. Brick walls to under side of roof boards.
4. Plank, 3 inches thick or more, splined with hard wood splines and metal clad.
5. Same painted with fire retarding paint.
6. Less than 3 inches, tongued and grooved, metal clad.
7. As above, painted with fire retarding paint, in frame buildings, Nos. 1 and 2 are required to extend through the sides, flush with the finish and built out laterally two feet or more on each side (separating wood finish by 4 feet or more of brick), this lateral extension

Digitized by Google

also serving to buttress the wall. (The reasons for this requirement are conclusive but cannot be well stated in limited space.) The object of this is chiefly to call attention to what seems defective legislation in the hope that some steps may be taken toward correction.

In the matter of rebating end walls and walls on the drainage side, it was not an unusual practice twenty or thirty years ago. Such construction may be found in many existing buildings and has done excellent service in resisting exposure fires.

Minor and "Near" Accidents

By A. S. Richardson

Bureau of Safety, Anaconda Copper Company

IN the whole field of accident prevention work there is probably no source of information which can be of greater use to "Safety First" men and workmen in general than the lessons that may be drawn from the observation or study of the causes of minor or "near" accidents. They are so frequent that nearly everyone has personal knowledge of some such occurrences almost daily or weekly, but because of the trivial consequences, little or no attention is paid to them. Actually each minor or "near" accident contains just as important a lesson as may be drawn from those having more serious results.

Does the accident caused by bad working conditions or the lack of some mechanical safeguard occur because the existence of the danger was absolutely unknown to anyone? In some cases it may, but generally it does not. Is the man who is injured because of some bad practice or through carelessness, injured because of a single indulgence in the bad practice? In the majority of cases, no. Usually the bad practice has continued until disregard for the danger caused the carelessness which resulted in the accident, or else carelessness was the general habit. It is therefore safe to assert that in a large number of cases the occurrence of serious accidents might have been foreseen had the occurrence of the minor or "near" accident received consideration. Here then is a subject worthy the attention of every man who is anxious to prevent injury by accident to himself or others.

To The Man On The Job the lesson will be contained in many occurrences where he will see men taking chances and escaping injury by only a narrow margin, and by personal experiences in the performance of his duties. To learn the lesson requires only the powers of observation and a realization of the possible consequences.

To the foreman or those immediately in authority, information regarding the occurrence of minor or "near" accidents may come from direct observation or indirectly from the men concerned. The general tendency is to pass over the occurrence as fortunately past, and to take no steps to prevent a similar recurrence. This is the wrong course. If repairs or guards are needed, the matter cannot be attended to too soon. If the accident happened because of some neglect or carelessness, those responsible for it should be disciplined. The habit of overlooking infractions of minor regulations pertaining to safety precautions weakens the respect paid to such regulations and eventually they may become entirely ineffective.

The work of "Safety First" has still much to accomplish and it would be well for those engaged in it to start at the bottom in the effort to eliminate the minor accidents. The more serious ones will then be fewer in number.

Digitized by Google

MATERIALS, APPARATUS, PROCESSES

IN THIS DEPARTMENT APPEAR REVIEW-ARTICLES ON PRODUCTS WHICH CONSERVE LIFE AND PROPERTY. THIS INFORMATION IS SECURED LARGELY FROM MANUFACTURERS. WE ACCEPT NO PAYMENT FOR ITS PUBLICATION

THE NEW PULMOTOR

The Draeger Oxygen Apparatus Company has secured the necessary rights from the manufacturers of Pulmotors in Germany and are now manufacturing the Pulmotor in this country. The new type B Pulmotor which has recently been placed on the market is a hand operated device constructed upon the only correct principle of measured pressures instead of measured volumes which depend upon the amount of pumping. Type B Pulmotor places the operator at the patient's head—not at the pump—free to devote his entire attention to the application of measured pressures—measured by means of the Pulmotor control valve in his hand. Indicator gauges show the operator the precise air pressures exerted of inhalation and exhalation. These indicators also show the first fluttering resumption of normal breathing. An important feature of the type B Pulmotor is that the patient can resume normal breathing while the mask is on, something hitherto impossible with any other hand operated device.

The simplicity of the type B Pulmotor is another reason why this machine should be available wherever there is likely to be a need for it. The new Pulmotor weighs 12 pounds and can be taken anywhere in an emergency.

THE FIRST HARTFORD AGENCY

The first agent appointed by the Hartford Fire Insurance Company was J. G. Trumbull at Norwich in 1810. It is interesting to note this agency at Norwich through direct and continuous succession is still writing Hartford Insurance. At the time the Hartford Fire Insurance Company authorized this agency this country consisted of a few struggling States and the Hartford Fire Insurance Company can truly be said to have grown up with the nation.

A few years ago the Hartford Fire Insurance Company formed the Hartford Accident & Indemnity Company and the slogan "Insurance Service of the Two Hartfords" is now well known throughout the country.

FIRE DOORS AND FIRE DOOR HARDWARE

Catalogue No. 25 issued by James Peters & Son, 1934 No. Front Street, Philadelphia, Pa., illustrates the types of fire doors and fire door hardware manufactured by this concern, and which bears the approval of the Underwriters' Laboratories. The Peters' new automatic swinging fire door is meeting with considerable success as it employs a new device for closing hinged fire doors. Its operation is simple, there being no springs to get out of order and the action of wheel and arm, being controlled by a weight, is positive in all cases. The device is in no way connected with the door. The door, being free on its hinges, can be opened or shut at will. The action of a fusible link when released by fire will make the door close. When an automatic door is not desired this device without the fusible link and cord will always keep the door in a closed position. It is equally applicable on a double or single door.

This catalogue also illustrates Panic Exit Door Bolts for theatres, moving picture theatres, schools, hotels, offices, loft and factory buildings. A slight touch at any point of the cross bar is all that is necessary to release the bolts and open the door. The vertical rods of the bolt then become locked in a released position, staying so until the door is closed, when the bolts are automatically released and return into the keepers by gravity, and the door again becomes locked. This concern also manufactures panic fire door latches used on hinged doors at entrances to fire towers, theatres or any place where the hinged tin lined door is used. The latch is operated by a slight pressure against the cross bar.

STEEL SHAFT HANGERS

In order to prevent, as much as possible, accidents in industrial plants, no hazards should be overlooked. Wherever a condition of greater safety can be secured it is the duty of the safety official in charge to make the necessary changes and so secure as far as possible absolute safety. The installation of industrial equipment which

Digitized by Google

surrounds the industrial workers with safer conditions not only reduces the danger of accidents but also acts as an encouragement to the men to be careful about taking chances. The installation of Pioneer Steel Shaft Hangers meets these two conditions and men working in factories where steel shaft hangers are installed in preference to others appreciate the employer's efforts to prevent, as far as possible, accidents in that plant. It is a fine example set by the company and is a proof that the men's safety is a matter of first importance to the employer.

Steel withstands the sudden and violent shock and strain to which hangers are sometimes subjected better than any other material. Should a hanger break, the release of belting and other transmission equipment on the men working below might have very serious results and it is in accordance with the principle, Safety First, that the strongest and most suitable material should be used for sustaining the overhead machinery in industrial plants.

The Standard Pressed Steel Company, manufacturer of Pioneer Steel Shaft Hangers, reports a large increase in the volume of business in 1916.

THE VALUE OF THE ENCLOSED SWITCH

Most electrical industrial accidents consisting of burns and shocks, some of which are fatal, are due to the victim coming in contact with exposed live parts. Often workmen inadvertently get some part of their bodies across the terminals at the switch or fuse blocks, or between one side of the line and the ground. Thousands of accidents, due to open knife switches, occur every year. The open knife switch is a distinct hazard and should receive the immediate attention of industrial safety officials. Progressive safety engineers are recommending that guardless voltage knife switches in industrial plants should be enclosed.

The Detroit Fuse & Manufacturing Company, Detroit, Mich., has specialized for some years in guarding knife switches and fuse boxes and has successfully met this hazard in the "Square D" Steel Enclosed Switch. This safety switch might well be termed "fool proof" because the guarding of the live parts is such that workmen can throw the switch in the dark without danger of coming in contact with it or getting their hands in contact with or across terminals. "Square D" Steel Enclosed Switches insure maximum safety for workers using electric power machinery. All live-current-carrying parts are completely enclosed—the operator throws the current "On" or "Off" by the handle outside the enclosing case. He cannot get hurt, no matter how careless he is. The "human element" responsible for nearly 75% of all accidents, is reduced to a minimum by "Square D" enclosed switches.

In this type of switch the cover may be sealed or locked when the switch is "On" or "Off," making it impossible to reach the live parts.

This Safety Switch and Combination Switch Box are coming into demand to such an extent that considerable detailed attention has been given by the Detroit Fuse & Manufacturing Company to improvising special types of switches for the various uses to which they may be applied in industrial plants, so that regardless of what current or voltage, or for what purpose the installation is to be used, such as exposure to acids, gases, or weather conditions, a suitable type of safety switch can be procured. Due to the evolution of safety as applied to electricity it is safe to state that the time is not far distant when the old style open knife switch will become obsolete, as its use will be discouraged under safety rules and regulations, as well as being regulated by laws which are gradually being looked upon as a necessity for the protection of life and limb.

PYROBAR TILE ROOF DECK

The Goodyear Tire and Rubber Company selected Pyrobar Tile Roof Deck for its rubber cementing plant at Akron, Ohio.

An essential requirement in the building devoted to the cementing of rubber goods is that the roof deck be non-condensing and of low conductivity in order to maintain unvarying humidity. Pyrobar Tile Roof Deck meets these requirements successfully, and, in addition, is fire proof and light in weight, permitting rapid erection. This product is extensively used for roofing of damp process manufacturing plants, and also for churches, schools and apartment buildings.

REDUCE YOUR EYE ACCIDENTS

Wherever the use of high grade Eye Protectors in industrial plants is insisted upon there is invariably a marked decrease in the number of eye accidents. SAFETY ENGINEERING is continually receiving most gratifying reports from manufacturing plants showing how eyes have been saved by the wearing of safety goggles. In fact the plant in which there is any danger to the eyes of the workers from flying chips, dust, fumes, dangerous rays both of light and heat, etc., which does not provide safety goggles and insist upon the men wearing them is negligent of its own best interests.

Many valuable men have been rendered useless by this serious oversight. An eye lost can never be replaced and the efficiency of the victim is seriously affected and often totally lost. The advantages which efficient eye protectors secure to workers and employers are so obvious and the cost of this protection is so slight, that there is no

Digitized by Google

logical argument which can be presented which justifies any industrial worker having his eyes subjected to danger. Leading safety goggle manufacturers have carefully studied the many different requirements of eye protection and there is now on the market a great variety of different eye protectors for meeting the many different requirements.

Insurance companies strongly recommend industrial eye protection as the only reliable means of preventing the appalling eye tragedies which have been so plentiful in industry in the past and which can be so largely reduced by the simple means of the safety goggles.

GRINDING WHEEL SAFEGUARDS

The Norton Company, Worcester, Mass., which has brought grinding wheel efficiency to so high a stage, has also given a great deal of attention to providing safeguards for grinding wheels. Experience has demonstrated that no matter how high the quality or how great the care exercised in the manufacture of grinding wheels, there is a liability, when a wheel is rotating at a high velocity, for it to suddenly burst, and when this happens parts of the wheel fly off and are liable to strike a man and inflict a serious injury. For this reason the Norton Company has designed protection hoods for grinding wheels, which offer maximum protection against a bursting wheel and prevent parts of the wheel from flying. They also protect the operator from dust. An interesting and instructive bulletin has been prepared explaining the necessity for these protection hoods. A copy of this booklet will gladly be sent by the Norton Company, Worcester, Mass.

PROTECTION AGAINST FUMES

For safeguarding workmen who come in contact with dangerous fumes such as ammonia, chemicals, and smoke and dust, respirators are a necessity. Herbert Garnet, Box 247, Toledo, Ohio, has specialized in the manufacture of respirators for many different requirements and invites inquiries for respirator needs.

UNDERWRITERS' LABORATORIES'

Recent Approvals and Reapprovals

The Underwriters' Laboratories, Inc., Chicago, under the direction of the National Board of Fire Underwriters and in co-operation with the Workmen's Compensation Service Bureau, maintains laboratories for the examination and testing of appliances and devices, and enters into contracts with the owners and manufacturers of such appliances and devices, respecting the recommendation thereof to insurance organizations.

The object is to give to the user the best obtainable opinion on the merits of appliances, devices, machines and materials in respect to life and fire hazards and accident prevention.

CHEMICAL EXTINGUISHER, 2½ GALS. LOOSE STOPPLE TYPE. Harker Mfg. Co., manufacturer, Cincinnati, Ohio.

HARDWARE—SLIDING PATTERN. Stowell Co., The, manufacturer, So. Milwaukee, Wis. Hardware for sliding, tin-clad, fire doors and shutters. "No. 20 A Wilbern."

HARDWARE—SLIDING PATTERN—HANGERS. Stowell Co., The, manufacturer, So. Milwaukee, Wis. Hangers of adjustable type consisting of hood, slide, apron, grooved wheel for tubular or flat track, limit roller tubular track, horizontal and vertical adjusting mechanisms, lever lock and bolts to mount hangers on doors.

HAZARDOUS LIQUID VALVES. McNab & Harlin Mfg. Co., manufacturer, New York City. Brass valves designed for use as gasoline control valves for discharge devices, etc. Working pressures not to exceed 50 lbs. per square inch.

HAZARDOUS LIQUID VALVES. Detroit Lubricator Co., manufacturer, Detroit, Mich. Brass valves designed for use as gasoline control valves for discharge devices, etc. Working pressure not to exceed 50 lbs. per square inch.

HAZARDOUS LIQUID VALVES. Hays Mfg. Co., manufacturer, Erie, Pa. Brass valves designed for use as gasoline valves for discharge devices, etc. Working pressures not to exceed 50 lbs. per square inch.

HAZARDOUS LIQUID VALVES. Lavigne Mfg. Co., manufacturer, Detroit, Mich. Brass valves designed for use as gasoline control valves for discharge devices, etc. Working pressures not to exceed 50 lbs. per square inch.

HOLLOW METAL FIRE WINDOW FRAMES. Haglin, C. F., manufacturer, Minneapolis, Minn. Hollow metal fire window frames and sash for wired glass, made in following patterns: Double Hung, Pivoted Upper, Single, Multiple, Top Hinged and Tilting.

HOSE COUPLING. Boston Woven Hose & Rubber Co., manufacturer, Boston, Mass. Expansion ring coupling intended for use on 2½-in. rubber lined fire hose.

HOSE COUPLING. Sherman Mfg. Co., The H. B., manufacturer, Battle Creek, Mich. Expansion ring coupling intended for use on 2½-in. rubber-lined fire hose.

HOSE, RUBBER-LINED. C. C. C. Fire Hose Co., manufacturer, Canton Junction, Mass. Cotton rubber-lined hose, either single, double or triple jacketed, and rubber hose, all sizes, for fire department use. Cotton rubber-lined hose for mill yard use, single jacketed.

SLIDING OR SWINGING, TIN-CLAD, FIRE WALL DOOR. Radding Co., The, manufacturer, Springfield, Mass. Three-ply tin-clad door designed for protection of openings in fire walls.

SWINGING, SHEET METAL SHUTTER. Pedlar People, Ltd., The, manufacturer, Oshawa, Ontario. Shutter made of two sheets of corrugated galvanized sheet steel, stiffened at the edges by a sheet metal frame. Corrugations on side next to wall horizontal and on other side vertical. Thin sheet of asbestos between corrugated sheets.

WATCH SERVICE, CENTRAL STATION. Holtzer-Cabot Electric Co., manufacturer, Boston, Mass. Type F Combination Night Watch and Fire Alarm Box. This box is furnished either with or without supplementary contacts for local or fire department signals.

Digitized by Google

SAFETY ENGINEERING

Vol. 32 OCTOBER, 1916 No. 4

Copyright, 1916, by The Safety Press, Inc. All Rights Reserved

Fifth Annual Safety Congress

National Safety Council

Detroit, Mich., October 17-20, 1916

Digitized by Google

NATIONAL SAFETY COUNCIL

ARTHUR T. MOREY
President, National Safety Council

W. H. CAMERON
Secretary, National Safety Council

THE Fifth Annual Safety Congress under the auspices of the National Safety Council marks the highest efficiency that the national movement to conserve human life has attained in this country. The National Safety Council's organization is already comprehensive, but a further development is planned. The activities of the Council cover the accident hazards and fire hazards in all industrial establishments, on transportation systems, whether steam or electric, and in mines; also the perils of city streets and other public highways. The Council's health service, with particular reference to occupational diseases, hygiene and sanitation, is making steady progress.

The Fifth Annual Safety Congress is a representative gathering of the most prominent industries in the United States. The National Safety Council began its work in October, 1913, with 40 members and $1,400. The present fiscal year shows a record of more new members and greater activities than any two previous years of the Council's life. A page of "Facts" regarding the Council, on another page, tells the story of the organization's remarkable growth.

The co-operation and complete har-

Digitized by Google

C. W. PRICE
Field Secretary, National Safety Council

mony of the various sectional organizations and of the local councils has been an important factor in aiding the progress of the work. In addition, independent organizations have co-operated in the cause of accident and fire prevention. Special mention may be made of the National Fire Protection Association and the National Board of Fire Underwriters.

HONORARY MEMBER

E. H. Gary, President American Iron & Steel Institute, New York, Association of Iron & Steel Electrical Engineers.

OFFICERS 1915-1916

Arthur T. Morey, President.
L. R. Palmer, First Vice-President.
C. W. Price, Second Vice-President.
E. R. Wright, Third Vice-President.
W. H. Cameron, Secretary-Treasurer.
J. J. Lamont, Assistant Secretary.
M. A. Dow, Director of Exhibits.

ROBERT W. CAMPBELL
Director, National Safety Council, and Former President

EXECUTIVE COMMITTEE

R. W. Campbell, Illinois Steel Company.
W. H. Cameron, Secretary-Treasurer.
Dean C. B. Connelley, Carnegie Institute of Technology.
M. A. Dow, New York Central Lines.
H. W. Forster, Independence Inspection Bureau.
Arthur T. Morey, Commonwealth Steel Company.
H. W. Moses, Edison Electric Illuminating Company of Boston.
L. R. Palmer, Pennsylvania Department of Labor and Industry.
C. W. Price, Field Secretary.
E. K. Prichett, The Macey Company.
C. B. Scott, Bureau of Safety.
S. F. Shattuck, Kimberly-Clark Company.
S. W. Tener, American Steel & Wire Company.
E. G. Trimble, Employers Indemnity Exchange.

Digitized by Google

MARCUS A. DOW
Director, National Safety Council

ARTHUR WILLIAMS
Director, National Safety Council

David Van Schaack, Aetna Life Insurance Company.

A. W. Whitney, National Workmen's Compensation Service Bureau.

H. M. Wilson, The Associated Companies.

E. R. Wright, Chicago.

R. J. Young, Illinois Steel Company.

DIRECTORS

Term expiring 1916.

J. C. Adderly, Secretary Millers Mutual Casualty Insurance Co., Chicago, Ill.

M. W. Alexander, General Electric Company, W. Lynn, Mass.

David S. Beyer, Manager, Accident Prevention Department, Massachusetts Employes Insurance Company, Boston, Mass.

W. H. Cameron, Secretary and Treasurer, National Safety Council, Chicago, Ill.

C. L. Close, Manager, Bureau of Safety, Relief, Sanitation and Welfare, United States Steel Company, New York City.

J. B. Douglas, Manager, Claim Department, United Gas Improvement Company, Philadelphia, Pa.

Douglas Fiske, President, Minneapolis Civic and Commerce Association, Minneapolis, Minn.

F. L. Hoffman, Statistician, Prudential Insurance Company, Newark, N. J.

J. B. Kennedy, Industrial Accident Board, Lansing, Mich.

Melville W. Mix, President, Dodge Manufacturing Company, Mishawaka, Ind.

Arthur T. Morey, Assistant to President, Commonwealth Steel Company, Granite City, Ill.

Lancaster Morgan, Treasurer, General Chemical Company, New York City.

W. H. Moulton, Secretary, Pension Department, Cleveland-Cliffs Iron Company, Ishpeming, Mich.

Digitized by Google

HERBERT M. WILSON
Director, National Safety Council

L. R. Palmer, Chief Inspector, Department of Labor and Industry, Harrisburg, Pa.

C. W. Price, Field Secretary, National Safety Council, Chicago, Ill.

Ross C. Purdy, Research Engineer, Norton Company, Worcester, Mass.

R. C. Richards, Chairman, Central Safety Committee, Chicago & North Western Railway Company, Chicago, Ill.

F. C. Schwedtman, National City Bank, New York City.

Z. G. Simmons, President, Simmons Manufacturing Company, Kenosha, Wis.

S. W. Tener, Manager, Accident and Pension Department, American Steel & Wire Company, Cleveland, Ohio.

E. G. Trimble, Manager, Employers Indemnity Exchange, Kansas City, Mo.

Arthur Williams, President, American Museum of Safety, New York City.

T. D. Williams, President, Brooklyn Rapid Transit Company, Brooklyn, N. Y.

H. M. Wilson, The Associated Companies, Pittsburgh, Pa.

G. L. AVERY
Director, National Safety Council

Edwin R. Wright, Editor, Chicago, Ill.

Term expiring 1917.

G. L. Avery, Secretary, Avery Company, Peoria, Ill.

Lewis T. Bryant, Commissioner of Labor, State of New Jersey, Trenton, N. J.

R. W. Campbell, Chairman, Central Safety Company, Illinois Steel Company, Chicago, Ill.

J. M. Eaton, Manager, Welfare Department, Cadillac Motor Car Company, Detroit, Mich.

F. H. Elam, Manager, Casualty Department, American Steel Foundries, Chicago, Ill.

O. J. Fehling, Manager, National Malleable Castings Company, Chicago, Ill.

Wm. J. French, Member, Industrial Accident Company, San Francisco, Cal.

W. F. Houk, Commissioner of Labor, State of Minnesota, St. Paul, Minn.

John Price Jackson, Commissioner,

Digitized by Google

DR. FRANCIS D. PATTERSON
Director, National Safety Council

Department of Labor and Industry, State of Pennsylvania, Harrisburg, Pa.

John Kirby, Jr., President, Dayton Manufacturing Company, Dayton, Ohio.

G. L. Mallery, Vice-President and General Manager, Security Mutual Casualty Company, Chicago, Ill.

E. A. Meves, Excelsior Wrapper Company, Grand Rapids, Mich.

Hon. C. P. Neill, Manager, Bureau of Information of S. E. Railways, Washington, D. C.

Dr. F. D. Patterson, Chief, Division of Hygiene and Engineering, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.

L. B. Robertson, General Attorney, Ford Motor Company, Detroit, Mich.

Chas. B. Scott, General Manager, Bureau of Safety, Chicago, Ill.

Dr. J. M. Shields, American Red Cross, Washington, D. C.

David Van Schaack, Director of Publicity, Aetna Life Insurance Company, Hartford, Conn.

A. W. Whitney, General Manager, National Workmen's Compensation Service Bureau, New York City.

Wm. B. Wilson, Secretary of Labor, Washington, D. C.

L. B. ROBERTSON
Director, National Safety Council

L. A. DeBlois, E. I. DuPont de Nemours & Company, Wilmington, Del.

Clifford B. Connelley, Dean, Carnegie Institute of Technology, Pittsburgh, Pa.

L. E. Reber, Dean, University of Wisconsin, Madison, Wis.

J. M. Guild, Safety Agent, Union Pacific Railroad Company, Omaha, Neb.

Sidney A. Johnston, State Factory Inspector, Missouri, St. Louis, Mo.

Term expiring 1918.

John R. Brownell, Superintendent of Safety, Industrial Accident Commission, San Francisco, Cal.

H. A. Bullock, Chairman, Central Safety Committee, Brooklyn Rapid Transit Company, Brooklyn, N. Y.

John Calder, Willett, Sears & Co., Boston, Mass.

E. F. Carry, President, Haskell & Barker, Inc., Michigan City, Ind.

Dr. L. W. Chaney, United States Bureau of Labor, Washington, D. C.

Digitized by Google

JOHN R. BROWNELL
Director, National Safety Council

E. K. PRICHETT
Director, National Safety Council

Howell Cheney, Cheney Brothers, S. Manchester, Conn.

Marcus A. Dow, General Safety Agent, New York Central Lines, New York City.

Geo. T. Fonda, Safety Engineer, Bethlehem Steel Company, South Bethlehem, Pa.

H. W. Forster, Chairman, Committee on Safety to Life, National Fire Protection Association; and Chief Engineer, Independence Inspection Bureau, Philadelphia, Pa.

C. M. Hansen, Managing Director, Pennsylvania Mutual Liability Association, Philadelphia, Pa.

Dr. A. M. Harvey, Crane Company, Chicago, Ill.

C. H. Howard, President, Commonwealth Steel Company, St. Louis, Mo.

L. A. Larsen, Assistant to Vice-President, Manufacturing Department, American Locomotive Company, New York City.

Edson S. Lott, President, United States Casualty Company, New York City.

H. W. Moses, Superintendent, Welfare Department, Edison Electric Illuminating Company of Boston, Boston, Mass.

W. J. Olcott, President, Oliver Iron Mining Company, Duluth, Minn.

E. K. Prichett, Secretary, The Macey Company, Grand Rapids, Mich.

J. A. Robertson, Chairman, Central Safety Committee, and Manager, Camera Works, Eastman Kodak Company, Rochester, N. Y.

H. D. Sharpe, Treasurer, Brown & Sharpe Manufacturing Company, Providence, R. I.

S. F. Shattuck, Treasurer, Kimberly-Clark Company, Neenah, Wis.

J. C. Smith, Safety Engineer, Inland Steel Company, Indiana Harbor, Ind.

L. B. Somerby, Factory Manager,

Digitized by Google

J. A. ROBERTSON
Director, National Safety Council

General Railway Signal Company, Rochester, N. Y.

W. B. Spaulding, Claims Attorney, St. Louis & San Francisco Railroad Company, St. Louis, Mo.

Dr. W. H. Tolman, Director, American Museum of Safety, New York City.

Robert J. Young, Manager, Department of Safety and Relief, Illinois Steel Company, Chicago, Ill.

NATIONAL SAFETY COUNCIL SECTIONS

Chemical.—Chairman, J. R. de la Torre Bueno, Editor, General Chemical Bulletin, General Chemical Company, New York City. Vice-Chairman, L. A. De Blois, Engineering Department, Safety Division, E. I. Du Pont de Nemours & Company, Wilmington, Del. Secretary, I. V. Kepner, Pennsylvania Salt Manufacturing Co., Natrona, Pa.

Foundry.—Chairman, O. J. Fehling, Manager, National Malleable Castings Company, Chicago, Ill. Vice-Chairman, F. G. Bennett, Safety Department, Buckeye Steel Castings Company, Columbus, Ohio. Secretary, Earl B. Morgan, Safety Engineer, The Norton Company, Worcester, Mass.

Iron and Steel.—Chairman, J. M. Woltz, Safety Director, Youngstown Sheet & Tube Company, Youngstown, Ohio. Vice-Chairman, George T. Fonda, Safety Engineer, Bethlehem Steel Company, South Bethlehem, Pa. Secretary, Earl B. Morgan, Safety Engineer, Norton Company, Worcester, Mass.

Mining.—Chairman, H. M. Wilson, Director, Department of Inspection and Safety, The Associated Companies, Pittsburgh, Pa. Vice-Chairman, B. F. Tillson, New Jersey Zinc Company, Franklin Furnace, N. J. Secretary, H. M. Wolflin, Engineer, United States Bureau of Mines, Pittsburgh, Pa.

Public Utilities.—Chairman, H. C. Lucas, Treasurer, Philadelphia Electric Company, Philadelphia, Pa. Vice-Chairman, J. B. Douglas, Manager, Claim Department, United Gas Improvement Company, Philadelphia, Pa. Secretary, G. H. Smith, Assistant District Superintendent, Central Hudson Gas & Electric Company, Newburgh, N. Y.

Steam Railroad.—Chairman, M. A. Dow, General Safety Agent, New York Central Lines, New York City, Vice-Chairman, J. M. Guild, Safety Agent, Union Pacific Railroad, Omaha, Neb. Secretary, H. J. Bell, Safety Inspector, Chicago & North Western Railroad Company, Chicago, Ill.

Health Service.—Chairman, Dr. Otto P. Geier, Director, Employes Service Department, Cincinnati Milling Machine Company, Cincinnati, Ohio. Vice-Chairman, Dr. J. W. Schereschewsky, United States Public Health Service, Pittsburgh, Pa. Secretary, G. L. Avery, Secretary, The Avery Company, Peoria, Ill.

Electric Railway.—Chairman, George Oliver Smith, Supervisor of Safety, Doherty Operating Company, New York City. Vice-Chairman, Edward C. Spring, Assistant to President, Lehigh Valley Transit Company, Allentown, Pa. Secretary, C. B. Scott, General Manager, Bureau of Safety, Chicago, Ill.

Paper and Pulp.—Chairman, S. F.

Digitized by Google

Facts Concerning the National Safety Council

The National Safety Council started work in October, 1913, with $1,400 and 40 members. Its staff at that time was two—now there are fourteen. It has been obliged to take larger offices on two occasions. A shipping room containing more than 1,000 bins for safety bulletins, etc., was opened three months ago.

At the end of June, 1914, there were 731 members.

At the end of the second fiscal year, there were 1,211 members.

The National Safety Council has gained 1,102 members this year; an increase of 91 per cent over last year's record.

The present membership is 2,270, with more than 10,000 representatives and 3,500,000 employes.

The income from dues for the fiscal year has been almost $50,000, with a surplus of cash and unpaid dues of more than $4,600.

The income for the calendar year 1916, if the average for the first seven months is maintained, will approximate $70,000.

Five "Bulletin Board" and "Service Series" bulletins have been sent out regularly each week for each $5 of membership dues.

The Annual Congress in 1915 was attended by more than 1,700 representatives of the Council. Fifteen sections were organized.

The Council Spent more than $5,000 on the congress last year. This included the publication of separate reports of the sectional meetings, and a book of 771 pages containing the full proceedings.

The Council's information bureau and library are daily solving the specific accident prevention problems of members. Two librarians are in charge of the library.

Twenty local councils have conducted regular meetings, safety rallies, inspection of plants, attended to local publicity, etc.

Mr. C. W. Price, former Assistant to the Industrial Commission of Wisconsin, began work on September 1 as the Council's field secretary. He will carry "Safety First" propaganda into every State in the Union.

Eight sections are issuing special sectional bulletins to the member-industries in each section. This makes the general bulletin service more specific.

Informational leaflets on "Safe Practices" will be regularly sent to members. The first on "Ladders" has been issued, and will be followed by others on "Stairways and Platforms," "Boiler Rooms," "Knots and Slings," etc., etc.

Fifteen thousand copies of the Council's safety primer, "Sure Pop and the Safety Scouts," have been sold. A second edition of 10,000 copies is now in preparation.

Digitized by Google

Shattuck, Treasurer, Kimberly-Clark Co., Neenah, Wis. Vice-Chairman, A. G. Richardson, Accident Inspector, Laurentide Company, Ltd., Grand Mere, P. Q., Canada. Secretary, E. P. Gleason, Nekoosa-Edwards Paper Company, Port Edwards, Wis.

Textile.—Chairman, W. C. Swallow, Amoskeag Manufacturing Company, Manchester, N. H. Vice-Chairman, Henry A. Hale, Jr., Manager, Bureau of Safety, American Mutual Liability Insurance Company, Boston, Mass. Secretary, Charles T. Miley, Carpenter Steel Company, Reading, Pa.

Cement.—Chairman, G. S. Brown, President, Alpha Portland Cement Company, Easton, Pa.; Chairman of the Committee on Accident Prevention and Insurance, Portland Cement Association, Chicago, Ill.

Employes' Benefit.—Chairman, J. M. Eaton, Superintendent, Cadillac Mutual Benefit Society of Cadillac Motor Car Company, Detroit, Mich.

Governmental.—Chairman, Lewis T. Bryant, Commissioner of Labor, State of New Jersey, Trenton, N. J. Vice-Chairman, John R. Brownell, Director of Safety, Industrial Commission of California. San Francisco, Cal. Secretary, Lew R. Palmer, Chief Inspector, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.

Logging, Lumbering and Woodworking—Chairman, E. G. Prichett, Secretary, The Macey Company, Grand Rapids, Mich.

Public Safety.—Chairman, Edward C. Spring, Assistant to President, Lehigh Valley Transit Company, Allentown, Pa. Vice-Chairman, Robert W. Campbell, Chairman Central Safety Committee, Illinois Steel Company, Chicago.

Smash on the Southern Pacific

Accident at Fresno, Cal.

Photo by Press Illustrating Service, Inc., N. Y.

Digitized by Google

Asphalt Shingle Question in Boston

Report to the Mayor of Boston by Building Commissioner O'Hearn

Asphalt Shingle Roof on a Garage at Nantasket, Mass. Photograph taken August 21, 1916. At that time the shingles had been on two months.

IN a recent report to the Mayor of Boston, Building Commissioner O'Hearn mentioned that for many years past attempts have been made to pass bills favorable to the use of asphalt shingles in the City of Boston. The special commission appointed in 1912 to consider the question of fire prevention reported unanimously against their use.

In 1915 bills presented to the Legislature in relation to this subject were given leave "to withdraw." During 1916 several bills were presented to the Legislature asking for permission to use "other composition shingles or roofing having the same or greater fire-retarding qualities as the commissioner may authorize." These bills had a hard time of it and were amended in the Senate, so as to read "of a quality, weight and thickness satisfactory to the building commissioner," viz:

Chapter 277. An act relative to the building law of the City of Boston. Be it enacted, etc., as follows:

Section 13 of chapter 550 of the acts of the year 1907, as amended by section 3 of chapter 782 of the acts of the year 1914, and by section 3 of chapter 352 of the special acts of the year 1915, is hereby further amended by striking out the next to the last paragraph and inserting in place thereof the following new paragraph: No material other than tile, brick, slate, metal, asbestos shingles, *asphalt shingles*

(*Continued on page* 206.)

Digitized by Google

Tests and Analyses of Asphalt Shingles

Office of Arthur D. Little, Inc., Chemists-Engineers-Managers.
Boston, July 11, 1916.

We have made tests and analyses of four samples of so-called asphalt shingles and beg to report our results:

	Sample No. 1	Sample No. 4	Sample No. 6	Sample No. 7
Thickness, inches	0.12	0.19	0.14	0.19
Weight, per sq. ft. ounces	10.85	15.90	11.80	15.77
Asphaltic Binder, per cent	45	65	55	53
Mineral Topping, per cent	41	25	35	32
Fibrous Backing, per cent	14	10	10	15
Asphaltic Binder, Ounces, per sq., ft.	4.88	10.33	6.49	8.36
Mineral Topping, Ounces, per sq., ft.	4.45	3.97	4.13	5.05
Fibrous Backing, Ounces, per sq., ft.	1.52	1.60	1.18	2.36
Nature of Mineral Topping	Red slate and green quartz	Silicate schist	Slate	Vitrified brick or native stone
Fiber Analysis of Backing:				
Jute or Manila, per cent	15	10	10	10
Rag (Cotton), per cent	65	70	75	75
Chemical Wood, per cent	10	10	10	10
Ground Wood, per cent	5	Trace	Trace	Trace
Wool, per cent	5	10	5	5
Tests on Asphalt Binder:				
Saponification Value	21	19	119	29
Equivalent to Saponifiable Matter	11	10	61	15
Melting Point, Deg. F	221	271	252	259

We have, as requested, also calculated the proportions of the various ingredients which will be present in a square foot of each shingle, if it were built to a thickness of ¼-inch in the same proportion:

	Sample No. 1	Sample No. 4	Sample No. 6	Sample No. 7
Asphaltic Binder, ounces	10.17	13.60	11.59	11.00
Mineral Topping, ounces	9.27	5.23	7.37	6.64
Fibrous Backing, ounces	3.17	2.09	2.11	3.11
Total Weight per sq. ft	22.61	20.92	21.07	20.75

1. Composition of the so-called felt base. You will notice that in each case the felt base contains very little wool. In spite of the fact that these are referred to by the makers as long fiber wool felt, the results of our tests do not surprise us. The writer was told recently by a manufacturer of felt asphalt roofing that it was practically impossible to get any wool at the present time and that the manufacturers were using rags and old papers. The presence of chemical wood and ground wood in these samples is doubtless due to the use of papers in making the felt. You will note that in each case the main constituent of the fibers is cotton rag. The jute or manila is doubtless added to give extra toughness.

2. Composition of the body of so-called asphalt filler. In three of the samples, namely No. 1, No. 4 and No. 7, the binder appears to be essentially asphalt. The saponification value would indicate that a small amount of some such oil as linseed had been added to the asphalt, probably to give it more flexibility. Calculating from the saponification value, the amount of oil is about 10 per cent.

Digitized by Google

of the fill in each of these samples. In the case of sample No. 6, however, the saponification value is much higher and would indicate about 60 per cent of oil. We would call your attention to the melting points of the asphalt binders. On sample No. 1 the melting point was 221 degrees F. This was only nine degrees above the boiling point of water. The other samples are considerably higher. Other things being equal, the higher the melting point the less tendency there will be for the asphalt to ooze.

3. Of what material is the top or weather portion? The topping in each case consists of a crushed mineral. On sample No. 1 it is a mixture of red slate and green quartz, quite finely ground and presenting a smoother surface than the other three samples. On sample No. 4 it is a ground rock belonging to the general class of silicate schists. The particles are larger, and the surface is quite rough. On sample No. 6 it is ground slate in medium particles presenting a fairly rough surface. On sample No. 7 it appears to be either a vitrified brick or a native stone, ground rather finely and presenting a fairly rough surface similar to No. 6.

4. How fireproof is the shingle? For the test of resistance to fire, we heated small pieces of steel of about the same size and shape to approximately the same temperature in the furnace. The pieces were then placed on each of the shingles while red hot. There was not a great deal of difference in the behavior of the samples. In each case they resisted the heat for a short time, but as soon as sufficient heat had penetrated to soften the asphalt, it began to ooze out and then took fire. Samples No. 1 and No. 4 appeared to be the least resistant, and sample No. 7 was the best.

5. The questions in this paragraph are answered above. There is practically no long wool fiber in any of the samples. The proportions of asphalt and topping, also the weight per square foot, we have given above

6. The proportions of the ingredients of the samples when built up to a thickness of ¼-inch, and also the weight per square foot, are given above in the tabulated results.

General Summary

The proportions of the ingredients in the four samples are fairly uniform when brought to the same basis, that is, ¼-inch thickness, the average of the four being as follows:

	Ounces.
Asphaltic Binder	11.6
Mineral Topping	7.1
Fibrous Backing	2.6
Total weight	21.3

None of the shingles is as resistant to fire as slate or asbestos. The test which we applied was a severe one, much more severe probably than would be met in service. The chief sources of danger would be (1) sufficient heat or heat applied for sufficient length of time to cause the asphalt to ooze out and take fire; (2) the curling up of the shingle with consequent exposure of the underside, which is merely felt of an inflammable nature. An increase in thickness would increase the stiffness and decrease the tendency to curl. Samples No. 1 and No. 6 which were about ⅛-inch in thickness were much flimsier than the other two samples, which were about ⅕-inch in thickness. These two latter, namely, No. 4 and No. 7, were fairly stiff, but in our opinion they should be still more stiff to insure that they will lie flat and not curl up. We should recommend that these shingles be made not less than ¼-inch thick to give the necessary stiffness.

ARTHUR D. LITTLE, INC.,
Roger C. Griffin, Chief Analyst.

Digitized by Google

(*Continued from page* 203.)

of a quality, weight and thickness satisfactory to the building commissioner, or slag shall hereafter be used to cover or roof any building, or the tops, sides and outside of the frames of any dormer windows, or any other projections of the roof of any building, except wooden cornices on wooden frame buildings; but on flat roofs composition of asbestos and asphalt or tar and gravel may be used, or such other composition of fire-resisting roofing as the commissioner may authorize. Nothing in this section shall be construed to prohibit the use of material approved by the commissioner for repairing any roof now covered with wooden shingles or to prohibit covering with such approved materials the roofs of buildings less than 16 feet in height: provided that the building is not altered in height or otherwise generally reconstructed. (Approved April 27, 1916.)

The refusal of the building commissioner to accept asphalt shingles as now on the market is not of recent origin nor a sudden notion of his. In 1912 he was a member of the State Commission appointed to investigate among other things, the asphalt shingle and in common with the rest of the Committee he went on record against its use. It was not his choice to appear at the State House, although this was his right and privilege if he so desired. He has no axe to grind and no interests to serve, other than to see that the best interests of the taxpayers and property owners are conserved and that the building law is carried out and it was only after repeated and insistent calls by the Legislative Committee that he appeared at the hearings.

As soon as the bill was signed, asphalt shingle manufacturers from far and near presented to the commissioner samples of their product for his approval. One and all were rejected as they did not conform in thickness to what he considered a safe shingle.

A long argument was carried on for the most part by the manufacturers or their representatives and the columns of the press were utilized to attempt to show that the building commissioner was biased against the use of the samples submitted.

The claims of the manufacturers and the real facts as known to the commissioner were so divergent and opposite that the department caused a representative lot of samples to be analyzed. The report shows the difference between what was claimed and what was actually found.

CLAIMED.	FOUND.
1. Pure wool base.	Cotton rag, jute or manila. Wood pulp.
2. Pure asphalt.	Abnormal amount of foreign oils, probably linseed oil. In one case the amount of oil was over 60 per cent.
3. High melting point and fire-resisting.	Melting point only nine degrees higher than the boiling point of water.
4. Will not pull or tear off roof.	See picture.
5. Will not lift or curl.	See picture.
6. They are the poor man's roofing.	See picture.

The use of asphalt shingles is prohibited entirely in Salem, Mass., and in St. Louis, Mo. In Philadelphia and in Buffalo, asphalt shingles are classified with wood shingles and according to the Boston building law, wood shingles are prohibited from the City of Boston. In the City of Lawrence it is advocated that asphalt shingles be prohibited in that city.

Some of the manufacturers claim that shingles a quarter of an inch thick cannot be made, but there is evidence to the contrary. In a letter to the commissioner one manufacturer states that at the present time owing to the high cost of felting material *it is not profitable* to put a shingle a quarter of an inch thick on the market.

Here then is where the pinch comes. If the market were normal as to the cost of raw material a quarter of an inch thick shingle would have been placed on the market long ago. There is just as much sense and reason in asking the building commissioner to approve an inferior shingle because of the cost of a superior one, as there would be in asking him to approve the use of steel or other building material of an inferior grade just because the cost of such materials of the proper quality is at the present time prohibitive.

Digitized by Google

Safe Practice at Blast Furnaces

By Frederick H. Willcox

Of the United States Bureau of Mines

[Mr. Willcox's paper is a "manual for foremen and men." In its efforts to increase safety in the metallurgical industries, the Bureau of Mines is studying the causes of accidents at blast-furnace plants and methods for their prevention. The paper describes the dangers of the different kinds of work about blast furnaces and points out how the risk of accident may be lessened or avoided. The paper also contains suggestions to foremen, master mechanics, and other officials on the methods of organizing and conducting safety work. Mr. Willcox's discussion of the responsibilities of foremen and his advice to workmen with regard to avoiding "common and familiar accidents" are embodied in the following extracts from his valuable paper.]

THE final responsibility for safety work cannot be placed on committees, gang leaders, or workmen. Practicable results in safety can not be obtained in that way any more than a plant can be run on such a basis. To put safety work on a sound and sensible basis the foreman must give the subject serious observation, study, planning, and direction, such as is given to operating work. The safety of the workmen always has been given foremost attention by foremen, but the reduction in accidents effected by many companies indicates that this attention has been concerned more with obviously dangerous factors than with injuries due to hand labor, use of hand tools, falls, falling objects, and similar causes incident to daily work. To these causes, however, the greater part of blast-furnace accidents is due. Following are the causes of accidents at blast-furnace plants, arranged in the order of their importance:

1. Hand labor.
2. Hand tools.
3. Flying and falling material.
4. Falls of person.
5. Burns from hot metal.
6. Machines and machinery.
8. Hot water and steam.
7. Cranes, hoists, and rigging.
9. Burns from cinder.
10. Flames.
11. Railroads.
12. Asphyxiation.
13. Slips.
14. Illness (including intoxication).
15. Hot flue dust.
16. Electric machinery.
17. Explosives.
18. Fighting and playing.

If "burns from hot metal" and "burns from cinder" were grouped together they would rank third. "Hand labor" and "hand tools" cause over 40 per cent of all accidents; if "flying and falling objects" and "falls of person" are included, over 60 per cent of all accidents are represented; and if "burns from hot metal and cinder" are added the total represents approximately 75 per cent of all blast-furnace accidents. This shows where the accident problem lies. Effective prevention of accident from these causes requires study, observation, experience, and instruction. No one in the plant is more capable of doing this than the foreman, no one is in such close contact with the men, and no one can combine such work with operating supervision so advantageously and effectively.

PRECAUTIONS TO BE OBSERVED AT BLAST-FURNACE PLANTS

The following suggestions, which cover the dangers incident to different kinds of work about the blast furnace, are not intended to serve as rules, but as useful memoranda to foremen and workmen. It is not necessary to call in the men and go through this circular with them from cover to cover; it is even of questionable benefit to call a crew together at their place of work and repeat a long string of "don'ts"; precautions can better be impressed on the men gradually and at opportune times. As the precautions given in these notes gradually come to be subconsciously in

Digitized by Google

the minds of both foremen and workmen at their work, to that degree will the number of accidents permanently decrease.

Avoid employing a man whose language no one of your crew can speak. Do not place a slow heavy man where a quick active one is required, nor a slow-thinking man where a quick-witted one is required, nor keep on the same job a man who gets hurt frequently in that occupation unless the labor supply is inadequate or men can not be shifted. When a man is employed or put to work on a new job instruct him as to his work and how to avoid accidents, warn him of unusual or obscure danger, and then put him under the charge of the gang leader or "straw boss." You should consider yourself personally responsible for accidents that happen to your men from their ignorance of danger or of safe methods. Therefore watch for dangerous practices, ignorance, lack of skill, and carelessness, and take the necessary steps to correct faults when first noticed. Most men can be taught and encouraged to use proper methods of work, but when necessary impress on the men by admonition, warning, suspension, or discharge, your attitude against carelessness or indifference. Drill your men to report immediately when injured, however slightly; send an injured man to the doctor or first-aid man, and then investigate the accident at once and discuss it with the sub-foreman and workmen in order to bring out clearly the cause and impress it on their minds.

Where it is possible, make dangerous places safe rather than attempt to guard them with signs. Where signs are necessary accept the responsibility for placing them, see that they are in good condition and that they are used. Make it your business to see that machinery, hand tools, tackle, scaffolds, or any other appliances are safe. Do not allow men to start or operate machinery unless they are so authorized.

Avail yourself of all safeguards provided for the men under your direction, such as goggles, leggins, and congress shoes when on duty about the cast house or pig machine. Exhibit carefulness in necessary personal work with machinery, electrical and steam equipment, and hand tools. Place and use prescribed safeguards or signs. In this way you will be better able to insist that the men under you observe similar precautions.

Personally supervise any work involving unusual accident hazard, such as work in gas mains or cleaners, tearing out linings, work in the cast house and about the stoves when blowing in or blowing out, or in event of a bad "mess" (piles of red-hot coke, slag, or iron spilled about the furnace, or in the yard, or on the tracks near the cast house), and any work about the bells or stock line. Don't allow men to go into any place dangerous from gas, falls, or falling material without breathing apparatus, safety belts and life lines, or watchers, as the nature of the work demands and circumstances permit. Never send inexperienced men to dangerous places or set them at hazardous work. Before sending or allowing men on top or where they will be exposed to material from slips, and escape is difficult, make sure that the furnace is not hanging. If the furnace is working stiff or slipping, the necessary precautions should be taken in regard to checking it or taking the wind off temporarily.

Recognize that work about blast-furnace plants will still be hazardous, even after all safety measures have been taken and the force is at the "top notch" of training, skill, and carefulness. Impress this fact on the crew and insist on thorough instruction and care of every man by his gang boss.

On occasions you will have to give detailed advice and directions to the workmen concerning dangers not described in this circular. The more common dangers arise in work about gas-containing equipment, work about the furnace in event of a breakout, heavy scaffolding and slipping of the furnace, stopping the furnace, blowing in, loosing the water supply, and so on. Many other hazardous operations will occur to you. For such work a set of rules or notes intended for some particular plant conditions are futile or may even be dangerous unless varied to meet the situation.

Digitized by Google

When unusual situations arise, safety depends on the measures taken by the foreman. Experience, coolness, and common sense are more essential than rules. Certain emergencies can be largely eliminated, however, by careful examination, forethought, and planning before undertaking dangerous work. At most plants it is the rule that, before any dangerous work is done, the superintendent and foreman together definitely determine the various steps to be taken. This should be the rule at every plant.

Following are some notes addressed to men in various occupations about the plant. Many of the men will be experienced in the different positions and know of all the principal dangers and practices mentioned. With such men all that is necessary is, when you notice them becoming careless or forgetful, to show them wherein they are becoming careless. In placing new men it is worse than useless to give them a large number of instructions, as they will only be confused. Keep these notes in mind and give them general instructions and any special instruction you think they need at first. Then continue to instruct them from time to time and have the "straw boss," gang leader, or sub-foreman do the same. Personally supervise their work as much as possible, and take advantage of every opportunity to forcibly impress on their minds the advantages of safe practice.

More and more, managements are valuing foremen by their care of the men as well as by their records for tonnage and cost. Keep the safety of your crew in mind always, and when you think of some new precaution in work or practice refer it to the superintendent at once and try to have it put into effect.

Familiarize yourself with methods of first aid and resuscitation.

COMMON AND FAMILIAR ACCIDENTS

The common and familiar accidents and their causes are mentioned in this circular. Most of these causes are so simple or obvious that there may be a tendency to regard them lightly, which is a great mistake, for they cause most of the accidents at blast furnaces. The inevitable risks natural to the work are numerous enough without enlarging on them needlessly. If the men to whose attention this circular comes will study it and follow the suggestions, lives will be saved, suffering avoided, working days gained, and jobs held, by reason of fewer accidents. Some accidents are unavoidable, but most accidents can be prevented by care, thoughtfulness, and observing the suggestions made by foremen and men and in this and other books on safety.

If you see anyone in a dangerous place, doing anything in a way liable to injure himself or others, clumsy in the use of tools, ignorant of danger, or ignoring the use of safeguards or safety rules, show him the danger and report the case if your warning is disregarded. Report at once unsafe equipment or tools, safeguards, or signs not in use or not replaced, and dangerous places unguarded. Watch other men's work for dangerous or unsafe methods, but be careful that your own work is done safely.

Keep things cleaned up. This is part of your work. Don't leave tools or materials on floors, platforms, or paths where they will obstruct work and make passage difficult. Take time to keep the steps and platforms you have to use free from ice and to knock down overhanging icicles. Take care of the odds and ends of lumber, scrap, brickbats, coke, limestone, and ore you find about the yard. The majority of falls are on the ground level and are largely caused by rubbish under foot. Watch where you step. Do not walk through steamy places unless it is necessary; if you must go, walk slowly.

Don't work where your material or tools can drop without being sure that the space below is guarded by danger signs. On the other hand, don't work where you know that material may fall on you; remedy the condition if possible.

In handling material such as ties, lumber, brick, bronze, castings, molds, plates, manhole covers, pipe, barrels, boxes, scrap, and pig iron, watch that nothing falls on your foot and be careful that your fingers are not caught. A large percentage of the accidents in blast-furnace plants happen in handling material. In using bars, sledges, wrenches, picks,

Digitized by Google

and other tools remember that many accidents occur by men being struck with them. Glancing, slipping, and falling tools cause still more accidents. In using common hand tools more skill and care is required to avoid accidents than with many kinds of machines.

Keep off of tracks if possible. If it is necessary to cross a track look both ways before starting across. If you must cross near a train keep at least a car length from the end of the train, as it may start quickly or there may be cars coming on the next track. Do not cross through a broken train unless the trainman motions you to come ahead or unless you are sure there is no engine at either end. Take time to go around a train or to wait until it passes rather than to climb through. Never crawl under a car. Avoid stepping on frogs, switches, or guard rails, as your foot may be caught. Don't move material with push cars unless guarded by a flag, and when working where a car might be shoved on you have a flag guarding the track approach. Don't ride on engines, cars or locomotive cranes unless your job requires you to do so.

Shoes should fit snugly about the ankle and leg, and the soles should be thick and free from holes that will allow the sole of the foot to be cut by sharp objects and protruding nails. Whenever you see protruding nails, stop and hammer them flat. In handling rough lumber, sheet tin, or material having sharp edges, it is best to wear stout gloves. For handling rough scrap wear safety hand leathers, not gloves, because in throwing the scrap down the rough edges may catch in your gloves and cause a bad wrench or fall.

Ladders should be provided with spikes or non-slipping pads and when in use should rest squarely on a level surface. Grasp the sides, not the rungs, of the ladder and face the ladder in going up or coming down. Don't attempt to slide down a ladder or to use one hand to carry tools, either ascending or descending. Defective ladders should be taken to the carpenter shop at once.

Defective tools should be taken to the shop as soon as the defect is noticed. Do not use a sledge, hammer, pick, or hatchet that is loose on the handle, has a mushroomed head, or a split or splintered handle. Bars and wedges should also be watched, and if any defect is noticed be laid aside for repairs. When sledging stand on the opposite side from the man holding the bar, so as to avoid hitting him.

Do not meddle with electric switches, water or steam valves, or gas connections; it may cause delays and even a bad accident. Do not touch any electric line or dangling or broken wires; you may get a severe electric shock. Wear gloves when changing or cleaning electric-light bulbs. Never turn on gas, steam, electricity, or water, or set machinery in motion with which you have no regular business unless you are specifically directed to do so.

Be watchful about the furnace. Gas may be escaping in many places and may kill you before you know it is present, the furnace may slip, the bosh or hearth of the furnace may break out, a tuyère may burst, or a blow pipe burn through, or there may be an explosion. Keep out of the cast house except when your work calls you there. The furnace crew can sometimes tell when accidents are about to happen by signs with which they are familiar; at times they happen without warning. Stay at your own work and be safe. Keep away from the bottom of the dust catchers, from under the downlegs of gas mains, and off of manhole covers of gas flues. Avoid iron and cinder ladles while they are being filled, shifted, or poured.

Do not go near a cinder granulating pit while it is in use and do not stand about gas burners or air doors of stoves. Never go on top of a furnace or gas washer unless under the direction of the foreman, or accompanied by some one. The tops of boiler settings, gas-engine basements, skip pits, and ore bins should be avoided unless your work takes you there. Before you begin work in such places, or in any place where there is a possibility of danger, wait until the foreman has told you that it is safe to go. Satisfy yourself that the place has been made as safe as possible. Never look in the peep holes of the tuyère stocks unless it is part of your duty. Always watch

Digitized by Google

when passing near the furnace. Remember that frequently it is impossible for the furnace men to tell when the furnace is going to slip.

Do not refuse to use safeguards, do not ignore rules and orders, or disregard danger signs. There is a reason for each and every one. Be sure to report every accident, even the slightest burn, cut, bruise, puncture, or substance in the eye, as this may prevent a trivial hurt from becoming a serious injury. Do not set bad examples by bravado, thoughtlessness, or negligence, for less experienced men to follow. Use common sense.

Those who can not read and speak English should be urged to acquire a working knowledge of the language at the earliest opportunity. By so doing they will be in a better position to heed warnings and become acquainted with dangerous practices.

Timely Hints for Tinners

Pennsylvania Department of Labor and Industry.

HANDLE carefully all metal with sharp edges. Slight cuts and scratches occurring while at work are often neglected and have many times caused blood poisoning.

If you cannot apply a dressing that is absolutely clean, have all wounds dressed by your doctor. A dirty rag cannot be considered "first aid." It is more dangerous than no aid at all.

Wear clothing that will protect you from stormy weather and save yourself from colds and other more serious sicknesses.

Handle all solder carefully, as it contains a large amount of lead. Lead poisoning may make you an invalid for life. Prevent it by keeping lead out of your system. Lead dust in the air is breathed into the lungs. Lead on your hands or lips is carried to the stomach when you eat. Do not breathe solder dust and always wash your hands and face thoroughly before eating.

Do not use unsafe ladders. This means ladders placed so that they may slip, as well as defective ladders.

In working on roofs see that you have proper support. Don't take chances.

While looking out for your own safety, do not forget your fellow worker and the chance passer-by. Place all tools so that they cannot slide or be jarred from their positions. In the year 1914, there were 7,635 persons in Pennsylvania hurt by falling material, 55 of them being killed outright.

Avoid fires by preventing them. See that all soldering furnaces stand firmly so that they cannot be easily upset.

Always extinguish your gasoline torch if leaving it only for a minute. Some one may tamper with it, or you may be detained longer than you expect and the woodwork be set on fire in your absence.

"Safety First" in Manual Training

DONALD V. FERGUSON, supervisor of the St. Paul (Minn.) manual training schools, has issued a bulletin urging greater precautions against the fire hazard in the school shops. Each shop will have placed near its center a metal receptacle for oily waste and other material which might cause spontaneous combustion or aid in the rapid spread of flames. The bulletin says: "Special attention is called to the question of fire risk in your shop. Watch carefully and see that no oily waste is left where it can set shavings or other inflammable matter on fire. Do not place supplies nor materials under stairways. Use great precautions in regard to this matter, as St. Paul does not want, and must not have, a holocaust."

Digitized by Google

Fire Prevention and Juvenile Workers

By Miss Mary McDowell

Proceedings of the National Fire Protection Association

I WANT to emphasize the need of fire drill in factories and stores where young persons are working. Human nature is human nature still, even when housed in concrete and iron with automatic sprinklers above and below, in a city with an efficient fire department and a municipal department of fire protection and public safety. Young people working at monotonous machine work in a crowded factory, 3 to 23 stories above the street, make a serious problem even in a fireproof building with all the fire prevention apparatus at work.

America has over 3,000,000 female wage earners over ten years of age, and we can safely say the mass are under eighteen, and nearly 200,000 children at work in mills and factories. Chicago alone has nearly 5,000 wage-earning children under 16 years of age, undeveloped, easily excited, yet capable of growing habits of mind and action. Chicago has also 116,505 female workers over sixteen and approximately under 20 years of age, and for our purpose they may be classified as girl workers. These with the children wage earners present our problem. These young workers are in fire provoking industries, such as clothing, millinery, lace making, box making, printing and publishing. They are excitable and naturally nervous, but can easily be drilled to a habit of action. Great numbers in the cities work in establishments that are not responsive to any new demand that asks for even a small amount of time or money.

It is said by labor statisticians that 73 per cent of the women workers north of the Mason and Dixon line do not get a living wage. As one woman said to me, "Not enough to be sick or to die on." To protect the lives and health of these young persons is the duty of society, and that means of business also.

After the Triangle waist factory fire Chicago passed one of the best of the municipal ordinances for a fire prevention bureau, having a compulsory fire drill clause that had been urged by many civic organizations and especially by the committee from the Women's Trade Union League. This ordinance required fire drills in theaters, schools, department stores and mercantile buildings three or more stories in height in which forty or more persons were employed above the second floor. This provision for compulsory fire drill was based upon the belief that even in the Asche building, which was fireproof (for it was said that the building stood intact and that the firemen walked over the floors a few hours after the fire) many of those 146 young lives might have been saved by the fire drill, which prevents panic from fear and nervous excitement. It seems hardly necessary to cite the success of fire drills in schools, but it may be well to remind ourselves of the fires where many lives might have been saved if the *habit* of *self-control* had been established by the fire brigade and fire drill. I have been told that loss of life might have been avoided if fire drills had been practiced in the following:

Union Paper Box Company, Pittsburgh, Pa., October 25, 1915. Thirteen lives were lost.

Diamond Candy Factory Building, New York, November 6, 1915. Twelve lives were lost.

Dr. George W. Price, M. D., Director of Joint Board of Sanitary Control of New York City, says: "I am convinced that the maintenance of fire drills among workers in factories teaches the workers the ordinary means of exit, a proper conduct during panics, an orderly manner of exit in case of fire, and a spirit of confidence in the possibility of escape during fires."

I know of several cases where small fires have occurred and where, were it not for the orderly exit of employes

Digitized by Google

trained by the fire drills, much confusion and probable injury to the workers might have ensued.

The Department of Labor of the State of New Jersey compels fire drills and publishes instructions for employes in the many languages of the people employed; Philadelphia and Portland, Ore., also have bureaus demanding fire drills. Wisconsin is preparing a bill including a fire prevention bureau and fire drills.

That Chicago has not had any recent unhappy experience is not saying it cannot have, for we have any number of buildings wherein the loss of lives might be far in excess of any of the eastern holocausts.

One point I desire to mention is that in the short time that we were enforcing the fire drill ordinance, we had one example of the value of this type of protection in a building on Ashland avenue, occupied by a clothing manufacturing firm employing approximately 125 persons. This building was of ordinary joist construction. The fire started over the heating plant. The alarm was sounded and the fire brigade responded with their hand pumps and extinguished the blaze while the rest of the employes left the building in safety. The fire drill clause in our city ordinance has been nullified by a case brought before the Illinois Supreme Court by an employer who seemed not to be of those who have yet come into that state of mind where life is valued above property. The court made its decision on a technicality and the city sent its poorest representative to plead this important matter.

The city fire prevention bureau tells me that since our ordinance was nullified the local fire alarm systems in practically all of the buildings where they were needed the most have not been taken care of, consequently are not in working order; whereas, in the better grade of buildings, occupied by reliable manufacturers, the fire alarm systems are kept in shipshape condition, fire drills are practiced and monthly reports submitted to this bureau the same as though the ordinance still held. At the time they had been enforcing this ordinance they experienced very little difficulty, as a rule, in obtaining compliance with this chapter of the fire prevention ordinance. Unless I am badly mistaken, I believe that the public in general and the average employer is in sympathy with this most important safety measure, even though employers sometimes hesitate when they discover that it is going to entail a little expense and time.

Before the Supreme Court decree the very efficient city fire prevention engineer, without friction, organized drills in one hundred and thirty-six factories, most of them in four-story buildings of cheap construction, practically without any fire protection equipment. It is these small manufacturers who need just this help in organizing fire drills, and there the danger is greatest, for since the Supreme Court decision they are under no compulsion to prevent that danger. Before they were willing and friendly after the city fire drill engineer had instructed them.

The loss of time occasioned by fire drill practice is certainly very small, as only about six minutes, once a month, is all that is required. It would be rather difficult for me to state just what that time would amount to in dollars and cents. However, as the majority of employes in the manufacturing plants do piece work, you can readily appreciate that the cost to the company would be very little. One of the largest clothing manufacturers says, "It takes about six minutes a month, seventy-two minutes a year, and the cost is so small as not to be worth mentioning." Indeed he says, "The gain is to the employer."

Perhaps I need not suggest to the business mind that the fire drill will be an economy in the end, a possible saving in liability as well as compensation for injury to employes. To the young wage earners who have "not enough to be sick on," it is a serious thing to be an invalid, indeed it is even worse than death; it often means pauperism and loss of self-respect. Many survivors from these tragic fires are nervous wrecks.

Any day Chicago may sacrifice upon the altar of greed and selfishness the lives of young workers. Dare we then afford to neglect any method of protection? The State will be asked for the protection now null and void.

Digitized by Google

Occupational Diseases in the Chemical Trades

By Charles Baskerville

Professor of Chemistry, College of the City of New York

[Remarks by Professor Baskerville, chairman of the Committee on Occupational Diseases in the Chemical Trades of the American Chemical Society, on opening the discussion on September 29 at the national convention in New York City.]

AN international congress, dealing with the subject of industrial diseases, was held at Brussels in 1910. The first congress took place in 1906 in Milan. Since then an institution has been established there devoted to the study of diseases of occupation and to matters of industrial hygiene. Previously museums of safety had been established in Berlin (1904) and in Vienna (1909).

The Brussels congress was attended by more than 600 delegates. Approximately 20 per cent of the papers presented were by medical men of Great Britian, where the subject has received attention for a number of years, from both the Factory Department of the Home Office, and the Association of Certifying Factory Surgeons.

A committee on occupational diseases in the chemical trades was appointed by the New York section of the American Chemical Society in February, 1912. Some of the reasons for the existence of the committee appear in the statement of its objects which were, specifically:

1. To hold itself ready to advise the Legislature of the State of New York in reference to matters appertaining to occupational diseases in the chemical trades.
2. To study various bills presented in the Legislature in an effort to avoid unwise technical legislation.
3. To superintend and inaugurate such investigations as might be decided upon which would look toward improvement of conditions of labor in the chemical trades.

Two members of that committee served the New York State Factory Investigating Commission and assisted in formulating the present laws having to do with inorganic chemicals, ventilation, and the regulation of the use of wood alcohol.

Subsequently the parent society appointed the present committee, whose personnel has changed but little since its creation. The objects of this committee have been to extend the intent and purpose of the sectional committee in so far as legislation was concerned. It was and still is the hope of the committee to secure sane and uniform legislation in all the States. This accomplishment, however requires time and patience, which are essential for bringing about things in a republic, where so many States of different interests, different modes of thought, etc., constitute the whole.

Another purpose of the committee has been to learn of specific conditions in particular chemical trades which might call for improvement. To that end its members in the several parts of America represented have sought information, solicited and offered advice. It has cooperated with boards of health and private corporations. Its work, however, has not been systematic nor in accordance with any well-defined plan, for the simple reason that no funds have been available to meet the expenses of investigation, adequate clerical force for propaganda, etc. The work requires financial support to be properly organized.

Informally the committee has learned that some manufacturers are doing much toward the protection of their labor, while others are absolutely inconsiderate. The former are governed by mo-

Digitized by Google

tives altruistic, or appreciation of the efficiency of a healthy workman, and they are frequently supported by laws covering the employment of labor in factories. They are often handicapped, however, by unwillingness on the part of labor to utilize the precautionary facilities placed at hand.

The other group of manufacturers, fortunately relatively few in number, are selfishly inhuman in some instances and going their way lawlessly or more often in blind ignorance, for the untoward action of some chemicals is slow and insidious. In fact, one of the important questions in connection with industrial diseases is: "Is it possible to draw a distinction between maladies which are the result of certain occupations and accidents?" This is of great significance in connection with the "workmen's compensation act" of England, and of the same importance in the relations between "master and servant" in this country. It is indeed difficult in many cases to ascertain whether a disease is the direct result of the nature of employment; but the justness of the principle of compensation for so-called industrial diseases is generally accepted, and the method of procedure by the aid of a schedule of diseases as adopted by the English law is regarded as a good example to follow. In the United States, certain severe and clearly traceable diseases resulting from occupational causes have had recognition, and active campaigns against such industrial maladies as plumbism and phosphorus poisoning have resulted in specific legislation.

Workmen's compensation laws have been enacted in about one-third of the States of the Union, and there is hope that a federal bill proposed may yet receive favorable action. The various State factory laws are, for the most part, however, concerned with minimizing fire-risks and obviating accidents to workmen engaged in purely mechanical operations.

Even though two excellent books on occupational diseases written in this country wholly or in part by some of the participants in this symposium have come from the press within the past two years, yet as reverted to above, the action of some chemicals is insidious and not always recognized. It is of prize importance therefore that the introduction of any novel substance into industrial operations or the introduction of a novel procedure (electrolytic zinc at Anaconda, for example) should be studied to detect possible danger at an early stage so that due precautions may be taken. Usually trouble is recognized only after its results have become more or less pronounced. It gets before a board of health and at once there is friction with the manufacturer who naturally resents interference.

Investigations on general industrial hazards should be carried on by the State, but only with co-operation of the manufacturers. Of the latter I am well assured. A form of benign paternalism, inevitable and to be desired in a safe republican form of government, would be welcomed by chemical manufacturers, but they resent wild legislation not founded upon technical and scientific investigation. It is therefore urged that there be a greater extension of the work on these lines by the Public Health Service in Washington, the Bureau of Mines, and the Department of Labor, as well as the several States. But the work requires co-ordination. It is the opinion of the chairman of this committee that a Museum of Safety should be established in Washington where the several governmental (national, State and municipal) officials and representatives of selected lines of chemical activity might co-operate by conference and advice. The proposed museum should perform not only an educational function, but investigate new as well as old conditions, and, if need be, volunteer advice to legislative bodies.

It is a fond hallucination of many to plan out something for the government to support, when its underwriting seems unlikely in other directions. A department of public health may yet be established and the proposed museum would naturally come within its scope.

Digitized by Google

Study of Accidents in 1915 in Cement Industry

Bureau of Accident Prevention, Portland Cement Association, Chicago, Ill.

[Extracts from a pamphlet prepared by Robert Brinton Hill, manager of the Bureau of Accident Prevention of the Portland Cement Association of Chicago. Lack of space prevents the reproduction of the complete tables and charts which make the book a valuable one to all interested in safety work and accident prevention, but it is hoped that the readers of SAFETY ENGINEERING may gain an idea of the thoroughness and attention to detail which the cement association has given to the study of its accidents.]

THE end of the year 1915 marked the completion of the third year during which the Portland Cement Association has collected accident statistics from its member companies.

The Bureau of Accident Prevention, appreciating the necessity of studying accidents upon a basis which would permit of comparison between the figures for different years, in July, 1915, instituted a scheme for the collection of figures on the labor distribution by departments and the nationalities represented among the employes of the various member companies. In the following study, it will be found that the relative hazards of various departments are worked out on such a basis, this being the first time such information has been placed at the disposal of the industry.

Owing to the difficulty in collecting accurate figures on the number of employes in the various companies for different periods of time, the majority of the accident figures have been reduced to a million barrels produced basis. This was worked out by totaling the production of those member companies who reported their accidents during each of the three years in which accident statistics have been collected. For example: During 1915 the companies which reported their accidents to the Bureau of Accident Prevention produced approximately 61,200,000 barrels of cement. Accordingly the figures under the various headings in this study were divided by 61.2. The same method was applied to the figures for 1913 and 1914, and so. from the columns appearing at the right of the majority of the tables, it is possible to make dependable comparisons from the figures for the several years. The number of accidents per million barrels produced can be determined by dividing the number of accidents under any heading by 52.5 for 1913, 50.6 for 1914 and 61.2 for 1915, those figures representing the millions of barrels produced during the particular year by companies reporting accidents. This is a decided step forward in the accident prevention work of the industry.

The most radical change in the form of the study for 1915 is the charge of 9,000 days lost, which is made for each fatal accident. In the two previous accident studies no such charge was made and for that reason the most severe accidents failed to have any weight in the distribution of time lost in the various tables, and while accident frequency is illuminating, accident severity, which is shown by the days lost chargeable to them, is of greater importance, and for that reason the change has been made. It is to be expected that there may be some who will take exception to the figure 9,000 as being too high, and in justification of the bureau's adoption of it. attention is called to the fact that the United States Bureau of Labor Statistics has recently adopted it as a standard fatality time lost equivalent for use in all of their studies. The figure is arbitrary. of course, but is nevertheless arrived at by perfectly logical reasoning, which is as follows:

Statistics show that the average age of workers killed by industrial accidents in this country is 30 years. From insurance mortality tables the expectancy of life at 30 years of age is 35 years. Deducting 5 years from this expectancy on account of the more or less hazardous employment of the industrial worker, the life expectancy is reduced to 30 years.

Digitized by Google

Figuring on a basis of 300 working days per year, the working days lost chargeable to each fatality amount to the product of 30 and 300 or 9,000. The use of this arbitrary days-lost charge for each fatality greatly increases the total number of days lost on account of accidents, but as it has been applied to the figures for all three years, comparisons are in no way disadvantageously affected.

The most gratifying and outstanding feature presented by this study is the fact that there were but 35 fatalities reported during 1915 as against 59 in 1914. Figuring upon the million barrels produced basis, this is a reduction of 50 per cent in fatal accidents. From this it is evident that results are being accomplished in the saving of human life and limb and the prevention of pain, suffering, and misery on the part of injured workmen and their dependents.

STUDY OF ACCIDENTS FOR 1915

The Bureau of Accident Prevention, at the end of 1915, had on file over 11,000 reports of accidents, 135 of which covered fatalities which occurred during 1913, 1914 and 1915. There is presented immediately below a summary of the accident figures for the three years during which statistics have been collected, which shows the situation at a glance.

SUMMARY COMPARISON OF ACCIDENT FIGURES FOR THREE YEARS

(All figures—per million barrels produced.)

	1913	1914	1915
Accidents reported	62.7	74.8	64.0
Days lost due to accidents.	7,473.8	11,047.0	5,640.0
Number of no-time lost accidents	21.7	29.1	27.5
Number of accidents causing less than 15 days lost	47.7	60.9	53.4
Number of accidents causing more than 14 days lost	15.8	13.9	11.4
Fatalities	0.8	1.2	0.6

As has been pointed out in the preceding foreword, but 35 fatalities were reported to the Bureau during 1915. This shows a reduction of 50 per cent in fatal accidents when compared with the figures for the year 1914. The causes of these fatalities are set forth in the table which follows:

CAUSES OF FATALITIES

Belt (caught between belt and pulley)		2
Belt (struck by and thrown).....		1
Car (railroad, box, run over by)...		1
Coal dust (spontaneous combustion of, burned by).....		1
Drowning		1
Earth (sliding, crushed by).....		1
Electrical	(contact with exposed wires)	4
	(shock from switch, standing on wet ground)	1
	(shock from switchboard, 440 volts).....	1
Elevator (working inside, started unexpectedly)		1
Explosion	(coal dust, burns from).	1
	(dynamite)	1
Falls	(from piers)	1
	(from trestle, struck by car on same)	1
	(from pulley, started without warning)	1
Lightning (struck by).....		1
Locomotive (started while man was working beneath)		1
Locomotive (run over by, while attempting to board).....		1
Shafting	(clothing caught on)....	2
	(fooling, threw rope over, which caught and threw man)	1
Stone, falling (all in quarry).....		4
Suffocation	(sliding shale, buried by)	1
	(sliding coal, buried by)	1
	(sliding raw material, buried by).....	1
	(sliding stone in storage, buried by)....	2
	(inhalation of gas and dust in feed hopper).	1
		35

If the 1913 and 1914 studies are referred to, it will be seen that the prin-

Digitized by Google

cipal causes of fatalities are practically identical with those for 1915. The following summary groups the fatalities for three years under general headings:

	1915	1914	1913
Caught by machinery...	7	21	13
Electrical	6	5	2
Sliding material	6	7	6
Falling stone	4	4	2
Falls	3	6	4
Rolling stock	3	6	5
Explosions and fires....	3	5	6
Miscellaneous	3	5	3
	35	59	41

Of the 1915 fatalities there is but one which can, with any justice, be termed an act of God. This is the case where a worker was struck by lightning while in the mill yard. It is interesting to note that there was a similar fatality last year.

Another table presents causes of accidents largely by acts and operations. At the foot of the table appears the total number of accidents charged to each department for the year, together with the total number of days lost chargeable to those accidents. The totals from the same table for 1913 and 1914 are given. Instead of figuring each of the causes on the number of million barrels produced basis, the following summary is submitted for the reason that some of the items are so small as to make figures on the million barrels produced basis of little value.

	Number of Accidents Reported			Number of Accidents Per Million Bbl. Produced		
	1913	1914	1915	1913	1914	1915
Article in hands of injured.....	149	135	124	2.8	2.7	2.0
Article in hands of fellow.....	93	88	116	1.8	1.7	1.9
Caught between parts (machinery)....	213	203	151	4.1	4.0	2.5
Caught by car doors.....	30	43	78	0.6	0.9	1.3
Contact with hot materials.....	141	120	96	2.7	2.4	1.6
Electrical	67	70	49	1.3	1.4	0.8
Explosions	64	65	56	1.2	1.3	0.9
Fall from machine, object, or appliance.	160	174	147	3.0	3.4	2.4
Falling machine part or object.....	694	778	826	13.2	15.4	13.5
Flying material	416	532	539	7.9	10.5	8.8
Lost balance (not tripping).....	59	57	85	1.1	1.1	1.4
Machine, part or object broken, loosened, or slipped	341	512	425	6.5	10.1	6.9
Power transmission machinery.....	67	89	74	1.3	1.8	1.2
Sharp edges or points.....	264	313	584	5.0	6.2	9.5
Striking against stationary objects.....	135	187	144	2.6	3.7	2.3
Struck by moving parts.....	45	58	67	0.9	1.1	1.1
Tripping over appliance or object.....	52	52	90	1.0	1.0	1.5
Strains from lifting and moving.....	49	58	77	0.9	1.1	1.3
All others	253	252	239	4.8	5.0	3.9
Totals	3,292	3,786	3,967	62.7	74.8	64.8

(To be concluded in November number.)

Digitized by Google

Safety Work in Gas and Electrical Industries

Special Problems of Public Service Companies to Protect Their Employes and the Public

Discharging and Grounding High Voltage Switches

FOR the safe and easy performance of the several necessary steps for discharging and grounding high voltage switches, the following devices and methods are used, as illustrated, by the New York Edison Company:

The ground discharge cabinet in Fig. 1 contains a ground discharge stick and two pairs of rubber gloves. The ground stick is connected through a cable and expulsion fuse to the station ground, provision being made for testing the continuity of the fuse by touching the stick to the metal plate above the cabinet which causes a pilot lamp to light if the ground circuit is continuous.

Fig. 2 shows the ground stick in use, the operater wearing the rubber gloves and applying the ground stick to each of the switch pots. Should the switch be alive from either side the expulsion fuse will blow.

After using the ground stick to discharge the switch to ground and to remove static, permanent ground clamps are connected to the switch before anything is done upon the switch or line connected to it.

As shown in Fig. 3, the permanent ground is made by means of a triple plug cable connected to ground and the plugs attached to a stud on each of the switch pots.

This is the standard procedure of the New York Edison Company in discharging and grounding high tension switches before an employe is allowed to work on the switch or on the apparatus or feeders controlled by it.

SAFETY ENGINEERING is indebted to the courtesy of the Safety Organization of the New York Edison Company (J. L. Murrie, safety engineer) for the particulars given above and the photographs.

Fig. 1. Ground Discharge Cabinet Containing a Ground Discharge Stick and Two Pairs of Rubber Gloves.

Digitized by Google

Fig. 2. Showing the Ground in Use, the Operator Wearing Rubber Gloves and Applying the Ground Stick

Safety Campaign in Kansas City

THE leading article in *Electric Traction* for September on "Rehabilitation of Kansas City Railways" contains the following regarding a safety campaign in that city:

With the opening of the public schools, on September 4, the Kansas City Railways Company, with the co-operation of the Board of Education, the Commercial Club and other industrial institutions, inaugurated a safety campaign the scope of which will cover accident prevention work in all its branches.

An important feature of the campaign will be the work in the public schools.

Digitized by Google

Fig. 3. Permanent Ground by Means of a Triple Plug Cable

conducted with the co-operation of the school authorities. Calendars and blotters will be distributed among the children throughout the entire school year. The blotters, which will be distributed monthly, are printed in four colors and carry a safety motto pertaining to the month issued, together with suitable illustration, also the words, "Safety and Service" with the name of the company. The calendars carry the same designs that are on the blotters. The Board of Education has also given permission for the distribution of Safety League buttons, while large bulletins will be posted from time to time in the various rooms. Motion picture films showing the price of carelessness and the necessity of always being on the safe side will be exhibited in all the school rooms equipped for showing them. In this connection lectures will be given.

Digitized by Google

This work will be in charge of a safety director who will work under a general safety committee consisting of the superintendent of efficiency, the publicity agent and a member of the legal department. This committee will supervise the work in the schools, the other public work and aid in the direction of safety work to be conducted among the employes of the company.

The company is a member of the National Safety Council and only recently a local safety council has been organized in Kansas City. Membership in this council embraces all the leading industrial concerns in Kansas City, Mo., and Kansas City, Kan.

The campaign will include vehicle owners and drivers. The first step in this direction will be the issuance of form letters to all drivers and owners urging them to do all they can to promote the general safety movement. This will be followed by placards to be placed in all stables and garages. In addition to this there will be talks by members of the council and others on the necessity for safety. This work will be carried on the general committee.

In the general public work there will be a new series of dash cards; also suggestions on the backs of transfers and on company stationery.

Arrangements have also been made to show the safety films in all the motion picture houses in the city. Safety literature will be placed in all cars, boxes being provided for that purpose. Talks will be made from time to time to the various civic organizations of the city.

In the work among the employes, the safety committees established at all divisions of the company will take an active part. Monthly prizes will be given for the best safety suggestions. At each division, in the shops and at the power houses as well as other places, bulletin boards will be maintained where literature and charts showing comparative number of accidents will be shown. Suggestion boxes will also be placed at these locations.

The work among the employes will be performed through extensively organized committees, as follows: Central Safety committee, departmental safety committees and local safety committees, and in authority will rank in the order named. These committees will pass on all matters having to do with suggestions for the elimination of accidents, through safeguards and inspection of property, and education of employes, etc. Suggestions for the prevention of accidents will be submitted to the general safety committee, composed of the followings: General manager, superintendent of efficiency, publicity agent, superintendent of employment, claims department representative, superintendent of ways and structures, superintendent of power and electrical distribution, superintendent of rolling stock and shops, superintendent of buildings, garage, etc., and superintendent of transportation. This committee, which will meet semi-monthly, will consider such matters as may be submitted to it by the departmental committees.

The departmental safety committees, one from each of the six departments, will meet weekly or semi-monthly and consider the local committee reports, accident statistics, etc.

Digitized by Google

EDITORIAL

War Profits and the Safety Engineer

ONE of the most interesting facts in connection with war profits is their direct dependence on the stability of labor. In almost every case where "war contracts" have been profitable, labor conditions were of the improved type. Inversely, in nearly every case where war contracts have been sources of loss, investigation shows that floating, disloyal and unstable labor is given as the explanation for the loss.

Is it merely a coincidence, therefore, that the organizations most active for industrial safety have reaped profits, while others have lost heavily on the same class of business? We hold to the contrary opinion. Industrial crises, such as the present and the immediate past, are the real and severe tests of safety and welfare departments. Profits in critical times like these are the intangible profits, so intangible that the short-sighted man cannot realize them. When the demand for skilled and unskilled labor equals or exceeds the supply, some employers are completely disorganized, while others are only slightly inconvenienced, or not affected at all. Is this chance?

We repeat that this condition is the real test of the effectiveness and value of the safety engineer and his department of industrial safety and welfare. Congratulations to those who have stood the test!

The Safest Way the Easiest Way

THERE are at least two ways to do every task, whether the task be wielding a hammer or dictating the policies of a nation. So, with industrial safety, we find many ways of performing the same operation and we offer no argument against the safe way being the right way. But human nature is not looking for the right way. It is looking for the easy way, the way that requires the least mental and physical effort.

Therefore, to make safety effective, it must be simple, or at least simple by comparison. Men will not walk up stairs and down stairs again when the same point may be reached by walking in a straight and level lin —it would require more physical energy. Men will not search their brains for unsafe methods if the safe method is obvious, for that would require too much mental energy. Therefore, the duty falls on the safety engineer not only to make men think safety, but to make safety so obviously simple and easy that it becomes a habit automatically.

Ideal safety does not lie in some intricate device or system, but in a simple and natural method which removes dangerous obstacles and functions, therefore causing the safety device, as such, to lose its identity to some extent. Since results are what we are striving for, the means to the end is to make the safe way the easiest way.

Digitized by Google

Education in Accident Prevention

By G. A. Orth

Secretary, Central Safety Committee, American Car & Foundry Company.

IF you, in your factory or plant, are not emphasizing emphatically "Safety First and Always," you are behind the times and are not keeping step with the greatest of all modern movements. And the movement is as yet in its infancy. When it has attained its promised growth, there will attend it conditions in the industrial world which as yet are scarcely dreamed of.

This movement is no longer considered a fad. It is one that has as its chief aim the conservation of life, health, time and money. We have heard all our lives that an ounce of prevention is worth a pound of cure, but only within the last year or two have we been scientifically applying that maxim to conditions in the industrial world. Now employers are studying the safety movement scientifically, and they are confronted with appalling facts. They are compiling the single accidents, and the result that not only startles with its magnitude, but horrifies as well, is that there can be, within the borders of this seemingly peaceful country of ours, such a daily, monthly and annual toll of human life and limb.

Great things, however, are being accomplished along this line, for the spirit of the "Safety First" movement is indeed contagious and it spreads rapidly when once it is inoculated. A brief survey of some of the things already accomplished along this line will show us the progress that is being made.

In large industrial establishments where the "Safety First" movement has been adopted, we find the mechanically preventable accidents are being eliminated in a great degree by the use of guards for exposed gears, belts, pulleys, saws, etc. Clean, orderly plants and shops have supplanted those which were once piled high with junk of all sorts. Neatly piled lumber and materials are found to be another aid to safety. The direct effect of good ventilation on the efficiency of factory workers is being realized as never before. Where injuries to the eyes have been frequent we find goggles supplied without charge to the workmen.

But when we have exhausted the demand for mechanical appliances and devices for guarding machinery and thereby protecting the workmen, we have covered only one-fourth of the problem of accident prevention. This has been shown to be true according to statistics. So here we touch upon the real and only solution of the problem of accident prevention—that of organization and co-operation between the employer and the employe.

We understand therefore why so much time is being given to the organization of safety committees among the men in the shops. Here rests the key to the solution of the difficult problem of co-operation. The well worn maxim, "You can lead a horse to water, but you can't make him drink," is applicable here. You can supply guards and goggles in abundance, but you can't make the men use or wear them without the co-operation of safety committees among the shopmen, who can and will report a failure on the part of a fellow employe to abide by the rules of the shop. One can readily appreciate how greatly the success of these committees and of the safety movement in toto, depends upon the support and sympathy afforded it by the superiors. Indifference is soon noted by the men and its example is quickly followed.

If the safety movement is to be of any value to an industrial concern, it cannot be left to the men in the shops to work out. It must have its impetus with the heads of the organization, and that impetus must be great enough to carry the idea through to the very last man. The men at the top need education in accident prevention as well as

Digitized by Google

the men in the shops. It is through education alone that real and vital results can be accomplished. Already along this line wonderful advances are being made. The value of whole bodies, useful limbs and eyes is being demonstrated by moving pictures and slides. Here are shown the crimes of indifference and negligence on the part of the employer and ignorance and carelessless on the part of the employe. Valuable lessons are learned, and even more valuable impressions are gained, by those to whom our alien tongue can convey little in the way of advice or warning. A number of slides of this character has been compiled by the National Manufacturers' Association, as one of its industrial betterment activities and may be had free of charge by any concern wishing to use them. This is certain evidence of a marvelous growth in the movement for accident prevention.

If we stop to think for a moment we realize that our country depends largely upon immigrants for its unskilled labor. Can we not see then the great need for systematic safety study and demonstration? Foremost in the important work of accident prevention is the "National Council for Industrial Safety." The object of this council, as expressed by this constitution and by-laws, is to "promote the conservation of life and its incidents in the industries of the nation." Much good work is being accomplished by this body. Connected also with the educational side of the "Safety First" movement, we have in New York the American Museum of Safety. This institution keeps on display all kinds of safety devices and appliances for guarding machinery. The kind of equipment best suited to his needs can be selected from the exhibit by any employer wishing to safeguard his workmen. The Museum also sends out lecturers to schools, shops and conventions. Thus we see that the "Safety First" idea is practically touching every walk of life.

While the conservation of human life and the alleviation of suffering and poverty should in themselves be sufficient reason for adopting this great principle of "Safety First," it has been found that as an asset to the employer, safety is of first importance. In shops where "Safety First" is the slogan, we find the highest efficiency, best dicipline and increased good will among the men. Efficiency is one of the practical results obtained from the adoption of this principle. Every employer wants efficiency in his men, but an efficiency which is interpreted to mean merely the speed with which the laborer performs his task, tends only to rob him of his vitality and energy and opposes the end for which he strives. He is less valuable both to himself and to his employer.

It has been proven that the adoption of safe and sane methods will increase instead of decreasing the output thereby sweeping away the last defense of the employer opposed to the safety principle on these grounds.

Undue strain of the physical powers causes a craving for stimulants. The satisfying of this desire not only wrecks health and spreads a corrupting influence, but it lessens the economic usefulness of the victim. This brings us to another reform which is taking place in the industrial world, which has aided in no small degree the prevention of a certain class of accidents and has materially added to true efficiency which must always rest on improved hygiene and clear thinking. I refer, of course, to the promotion of total abstinence among those employed throughout the industrial world. Many large concerns of this country have made it imperative that their men adopt this rule and already there is a marked reduction in the percentage of preventable accidents. The youth of this land are receiving, through the schools the knowledge of the effect of these stimulants on their bodies and minds. They should receive through this agency also, the training in carefulness and forethought which will prevent needless loss of life and lessen the number of helpless cripples. We can gain this ultimate end by education alone, in the shops, in the schools, everywhere. If we accomplish it, we shall have erected a monument to humanity and achievement that will endure to all posterity. Let our slogan be "Safety First and Always."

Digitized by Google

Importance of Safeguards in Industrial Safety Campaigns

IN deciding to hold an exhibit of safety devices under its auspices at the 1916 Safety Congress, Detroit, the National Safety Council has again extended its field of usefulness to its members and all others engaged in the prevention of accidents in industry.

The mechanical side of industrial accident prevention is highly important. Almost all accident prevention practice calls for safeguards and safety apparatus of one kind or another. Eye injuries are prevented by the use of safety goggles. Workers subjected to dust, fumes and other highly dangerous substances need protectors for the eyes, nose and mouth. In order to prevent accidents to operators of presses and drops, guards are needed on the machines. The prevention of accidents from electric shock is highly important, and the installation of safety electrical equipment is necessary to safeguard electrical workers against injury. Dangers that confront foundry workers call for protection for the feet, hands and other parts of the body.

Within the sphere of the accident preventionist and the fire preventionist is the safeguarding of buildings and property. A boiler explosion or flywheel explosion may result in the serious injury and death of men in parts of the factory away from the engine room. Safety appliances for boilers are necessary to safeguard men in all parts of the factory, for a boiler explosion may wreck the plant.

The terrific explosion at Black Tom Island, New Jersey, recently, demonstrated the safety afforded by wire glass windows in several factories adjacent to the scene of the explosion which stood the shock where ordinary glass windows shattered and caused splintered glass to shower down. The slipping hazard is one that is responsible for a great number of diversified accidents. Slipping is dangerous anywhere, but many accidents are caused in industrial plants as a direct result of slipping. The use of safety treads reduces this hazard.

The securing of the safest possible conditions in industrial plants is one that calls for a knowledge of the many excellent devices and varieties of apparatus made for the purpose of safeguarding life and property. As knowledge extends on this subject, greater conditions of safety will be secured, due to the increased protection afforded by improved safeguards.

The duties of the progressive industrial safety official who is striving to reduce injuries to the operators, as far as possible, calls for a thorough knowledge of the most reliable safeguards. Educating workmen against recklessness and teaching them to be careful while a highly valuable feature of every industrial safety campaign has its limitations because of the human element. A man may exercise caution in his daily work for 1,000 hours and may forget carefulness on the one thousand and first hour. He may have some worry on his mind, perhaps sickness in his family, a death of some one near and dear to him, or he may be feeling anything but well himself. Any one of many such causes may account for an operator being careless of himself, temporarily, and the carelessness of one hour may result in exposing himself to danger.

To date the following named concerns have engaged booths in the exhibit of safety devices and apparatus under the auspices of the National Safety Council in the Armory Building, Detroit, October 16-21. The manufacturers of safety devices listed below are exhibiting the devices they manufacture. In addition to these concerns, it will be noted that some railroads, manufacturing con-

Digitized by Google

cerns, etc., are exhibiting features of their safety campaigns.

LIST OF EXHIBITORS, COMMERCIAL SAFETY EXHIBIT, DETROIT.

American Abrasive Metals Co., New York.
American Lighting Company, Chicago.
American Museum of Safety, New York.
Baltimore & Ohio R. R. Co., Baltimore.
Detroit Fuse & Mfg. Co., Detroit.
De Vilbiss Mfg. Co., Toledo.
Draeger Oxygen Apparatus Co., Pittsburgh.
Fyr Fyter Co., Dayton.
F. A. Hardy & Co., Chicago.
Julius King Optical Co., New York.
Krantz Mfg. Co., Brooklyn, N. Y.
Life Saving Devices Co., Chicago.
Lineman Protector Co., Detroit.
Multi-Metal Separating Screen Co., New York.
New Jersey Zinc Co., Palmerton, Pa.
New York Central Lines, New York.
Norfolk & Western R. R. Co., Roanoke, Va.
Norton Co., Worcester, Mass.
Oliver Machinery Company, Grand Rapids, Mich.
Jos. T. Ryerson & Son, Chicago.
Safety Engineering, New York.
Safety & Efficiency Bureau, Columbus, Ohio.
Safety First Supply Co., Pittsburgh.
R. P. Smith & Sons, Chicago.
Strong-Kennard & Nutt Co., Cleveland.
Thompson Electric Co., Cleveland.
U. S. Bureau of Mines, Washington, D. C.
Walsh Press & Die Co., Chicago.

Insuring the Wearing of Goggles

By F. W. King

THE introduction of safety goggles in the plant has been found difficult, in some instances, on account of the indifference or even prejudice of the workmen themselves. After a supply of goggles has been purchased the problem arises of how best to insure their proper use and, unfortunately, the objection is not confined to any class.

The uneducated foreigner, ignorant of our language and unable to read even his own, can be taught by the good example of his superiors. Do not for a moment labor under the delusion that your particular set of men are any different from those employed by other firms who have solved this problem. They are not. All classes of workmen have been obliged to follow the ruling of various local safety organizations requiring the wearing of goggles. So the first step should be the invariable practice of all heads of departments to wear goggles where there is even a possibility of an eye hazard.

First, your safety inspector absolutely must have the hearty support and backing of the firm, so he can enforce the rule by such discipline as he finds is required. When the men realize that he is to be the judge, they will sooner understand how important the matter is to the firm. The safety inspector must secure the co-operation of foreman and shop superintendent and make them members of the safety committee. These men, including the safety inspectors and members of the firm, should always wear goggles in the shops and about the plant and thereby set an example to the men. No visitor should be permitted to go about without goggles, no matter what his rank.

Discipline may include a rule that those who refuse to obey safety regulations lose any chance of promotion, that such refusal may cause suspension or, in exaggerated cases, may mean discharge; nor should the man's ability at his particular task be any reason for allowing infringement of rules made for all. The above is the generally accepted method used today by the largest corporations. Others do not propose to waste any time over the question but

Digitized by Google

simply publish the rule and if a violator is caught, he is laid off without pay 10 days for first offense and discharged on the second.

In nearly every shop will be found some man, or group, who are acknowledged leaders and who may be of great help, if they show the right spirit, and his or their co-operation should be sought. On the other hand, if they cannot be made to see the value of the movement, and show by their conduct that deliberate evasion or disobedience is intended, discharge is at once the easiest and the best means of stopping their bad influence; and remember the bigger the man the greater will be the impression on the rest.

One man should be responsible for the issuing of goggles and the care of the reserve stock. He should become thoroughly familiar with the proper selection and adjustment and should make sure that each goggle fits easily and properly. If that is not done, eye strain will result from the frame causing undue pressure upon some sensitive nerve. Men cannot be expected to wear goggles, if they are uncomfortable, because of pressure on some sensitive nerve. Goggles may be adjusted so as to offer no interference to vision and be as comfortable as ordinary spectacles.

If your men complain of their goggles, give immediate attention to their complaint. In nearly every case the fault is lack of care in selection and is easily remedied; in the remainder of cases the difficulty may be due to necessity for lenses ground to correct some error of vision.

Many plants supply special goggles with lenses ground to prescription in cases where a good workman has defective vision. This is a special item and is necessary in but few cases.

And, lastly, do not forget that a lost eye may cost the company an amount as high as $2,000—enough to buy about 2,500 pairs of high quality goggles.

Pennsylvania Will Approve Safety Devices

THE INDUSTRIAL BOARD of the Pennsylvania Department of Labor and Industry is establishing a list of safety devices that meet all requirements of State laws and safety standards. The board has created an approvals committee, consisting of two members of the industrial board, the engineers and physicians of the division of hygiene, the safety engineer of the department and the chief of the inspection bureau, to pass on the safety devices submitted for approval.

Regular meetings of the approvals committee will be held the last Wednesday of each month when manufacturers of safety equipment, desiring to receive the approval of the State, may submit their devices. Every device must be submitted separately and obtain separate approval in each case. The application must be accompanied by the device itself or a working model with an 8-inch by 10-inch unmounted photograph and a copy of the Underwriters' Laboratories' approval, if it has been presented to that institution.

When the approvals committee has approved a design, the action is to be considered by the industrial board at its next meeting, and if ratified by the board, the device will receive a certificate of approval bearing the seal of the Commonwealth.

Manufacturers of equipment approved by the State will have a distinct commercial advantage, as the customers of such manufacturers may feel assured that approved safety products will afford adequate protection to workers, at the same time meeting all the legal requirements of the State.

Among the inventions already approved by the committee are metal guards of various kinds, safety loom locks, fire doors, boiler appliances, motion picture machines and appliances including film rewinding machines, and a lungmotor.

Digitized by Google

Little Journeys In Fire Logic

No. 1—Bridging

By Charles E. Worthington

FIRE burns rapidly in rough board vertical flues such as those between the studding of a frame house. The draft of a chimney is there and also combustible walls and rough surfaces for fire to consume.

Fire expands air by heating and the heated air cannot move rapidly enough but presses against the sides of the flue.

If the flue vents into a similar flue, but horizontal like that between floor joists, fire will be forced into it by expansion of the air.

If the horizontal flue opens into another vertical flue at the other end the draft in that flue will draw the fire through the horizontal one.

Little crossed pieces of kindling wood at intervals (called bridging) are of very great assistance in expediting the progress of fire and increasing its intensity.

Fire-stops at floors, as usually applied, modify, but do not wholly eliminate, the draft and in nowise interfere with the progress of fire through the joist channels.

Bridging is a device to keep joists from buckling. It is usually made by splitting up some of the trimmed off ends of joists. The remainder of the trimmed off ends are usually taken home by the workmen for firewood; sometimes they are gathered and sold for that purpose.

Solid bridging, i. e., blocking the joist channels by inserting pieces of joist ends to fit and fill them, would stop draft *through* the channel and would subdivide it into little cells, so that if care was taken to have these blocks coincident with the furring strips the joist channels would be stopped securely at several points.

This form of bridging would be as effectual in preventing buckling as crossed pieces of kindling wood.

Rats and mice traverse the open channels freely, build in them their nests of rags and straw and matches and find access through them to warm places against hot air and steam pipes or chimneys which they consider most suitable for this purpose.

Solidly blocked channels cannot be traversed by rats or mice. They cannot gnaw through plank 2 inches thick or more where there are no exposed corners or edges.

Ordinarily nearly enough trimmed ends could be found to supply the pieces needed. The few extra joists needed to supply the deficit would cost less than the extra labor in splitting and fitting the kindling wood bridging.

This applies to rafters in roof as well as floor joists, also to side walls except that in that case some extra lumber would be needed, and it would cost something.

A building with floor joists and roof joist channels stopped off by solid bridging would be very much safer than one constructed with kindling wood bridging (as true of open ceilings as sheathed ones).

There is no *good* excuse for neglecting actual fire protection that costs little or nothing except ignorance, and ignorance is no excuse at all. Indifference has not the dignity of an excuse.

Custom, i. e., doing something simply because some one else did it previously, *is not justifiable* in the face of adverse results, when the facts are known, nor is it a sufficient reason for persisting in error because others do the same. There is always a first one to see the light and plenty to follow when the lead is set. Men are much like sheep; and while they prefer to do wrong in a body rather than right singly they generally prefer to do the right thing if they can have company.

Ought not *some* builders to set the pace for others to follow?

Digitized by Google

Studying the Causes of Accidents

By Hermann V. Schreiber

AS much as we may wish to ascribe each accident to a specific cause, we all know that many causes have probably contributed to the result. We know also that two happenings may produce the same injuries but the circumstances leading thereto may be widely dissimilar.

From the standpoint of the safety engineer more interested in prevention than in statistics this knowledge makes every condition favoring accidents a matter of importance. In a given instance a single condition or circumstance alone may have been necessary to have produced an injury. This fact, where we note it, makes near accidents as instructive as actual accidents.

Every possible factor which may contribute to an accident thus becomes something of interest and importance. Our kindness of heart or our ignorance may make us willing to call many happenings accidents where frankness and truth would make us confess that they resulted from somebody's ignorance or wilful neglect.

It is interesting to make a study of some specific establishment, such as a metal working plant from this viewpoint, and analyze the conditions to determine which may be contributing causes of accidents and classify them so that they may be studied and corrected. Such general grouping might be under the following general headings:

General Conditions.
Management.
Force.
Structures.
Yards.
Tools and Equipment.

As a further aid in the process of elimination the subjects in this group may be further subdivided somewhat as follows:

General Conditions:

The Industry. Its inherent trade risks, methods, materials and men.

The location. Risk to or from surroundings.

The size as affecting the risk.

The type of management and effect of local or distant control.

The raw material and produce as causes of risk.

The type and efficiency of the management and its labor policy.

Such general conditions, it is to be observed, affect the entire establishment, and in general are beyond the scope or power of the safety engineer to correct.

They are nevertheless worthy of study, and their significance in each case from a safety standpoint should be laid clearly and forcefully before the management that it may appreciate its responsibility.

The second subject may be subdivided to bring out the effect of its group of contributing factors as follows:

Management.

Local or distant control.

Efficiency. As to financial success, labor turnover, control of force, maintenance, structures and equipment.

History and reputation. Stability.

Labor policy. Wage rates, fair dealing, organization.

Understanding and appreciation of safety and welfare work.

Employment and training methods.

Rules. Scope. Enforcement.

Education of employes in safe practice.

In so far as the safety engineer is permitted to have a voice in the administrative councils of his plant he is able to indicate the importance of these factors to the management. Wage policies, employment and training methods may be more or less modified to take into consideration the facts and figures he may be able to present. The education of the force in safe practices must necessarily be in the hands of the safety engineer, who is held responsible that the safety and welfare campaign does not proceed more rapidly than the men are able to follow and understand and appreciate it.

The third group of factors is perhaps

Digitized by Google

the most important. Under this heading may be included:

Force:

Number of sexes and departments.

Apprentices, nationalities, turn-over.

Freedom, intelligence, co-operation.

Homes, location, accessibility, character.

Relative proportion skilled and unskilled.

The size of the force and its makeup will probably control the rate at which safety and welfare activities can be introduced. Leaders will be an immense help, but the essential parts of the program and average result must not be expected to exceed the capacity of the ignorant classes. The accidents they will produce will otherwise seem to be beyond control and the scope of the service of these individuals will be greatly decreased.

Under the fourth heading may be included a considerable number of items which in large establishments require the time and attention of competent engineers. These matters may include the following:

Structures:

Size, height, design, materials of construction, adaptability, foundations, grouping, stacks.

Floors. Condition, cleanliness, illumination.

Equipment.

Lighting, natural and artificial. General and detail distribution.

Heating and ventilating. Adequacy, control, heating plant.

Transportation system:

Foot and general vehicle. Doors, passage spaces.

Elevators, stairs and runways. Freight and passenger. Emergency capacity.

Cranes. Rails, chains, buckets. Access.

Locomotives and cars, tracks, control, clearances.

Conveyors. Driving units, supports, spills.

Power supply:

Source. Location, boilers, fly wheels, piping, wiring.

Stacks, location, size, supports, guys, inspection devices.

Transmission and distribution system, location, condition.

Driven units. Unit or group drive. Belting.

Fire prevention and fighting system.

Provision against fire or accident catastrophe.

Sanitary equipment. Design, condition.

Water supply. Sources. Cups or fountains.

First aid equipment.

As suggested above, these items all require careful attention of engineers trained for the work and where they fully appreciate the safety engineers' viewpoint they can be of very great assistance in eliminating conditions which may aid in producing accidents.

Usually yards are not given the attention they warrant, but the following brief list of items under this heading suggests there is often ample opportunity for accident in this part of an establishment:

Yards:

Drainage, illumination, transportation system and handling facilities, piling systems.

The last heading including the group of causes most in evidence has perhaps been given the most attention. Some of the significant factors may be listed as follows:

Tools and equipment:

Hand tools. Design, condition, adaptability.

General. Location and grouping.

Belts and shafting. Motors. Group or unit drive. Control.

Hazard from cranes, transportation systems, etc.

Accessibility of whole and of parts.

Guards over moving or dangerous parts.

Raw materials. Finished product. Waste.

Illumination. General and detail.

In spite of the general attention given to this group of causes it warrants the constant attention of the safety engineer as many of those ordinarily interested are so close to and so accustomed to the risk involved they are either ignorant or indifferent to it.

Digitized by Google

Safety in a Candy Factory

APPLIED safety engineering is again telling its own story in the plants of the William H. Luden Company, Reading, Pa., in a most attractive manner. In this particular case the problems were varied, and some very obstinate, but concentrated thought and work on the part of Fred S. Cook, superintendent and safety engineer, and his associates, are beginning to show results and pay dividends.

One of the problems which are peculiar to this plant is the seasonal fluctuation of the number of employes, the figure varying as much as 200 per cent for different seasons; and another serious obstacle was the lack of a precedent established by other candy manufacturers solving the problems.

The illustrations, however, show how these men have adapted established safety principles to the cases involved, and

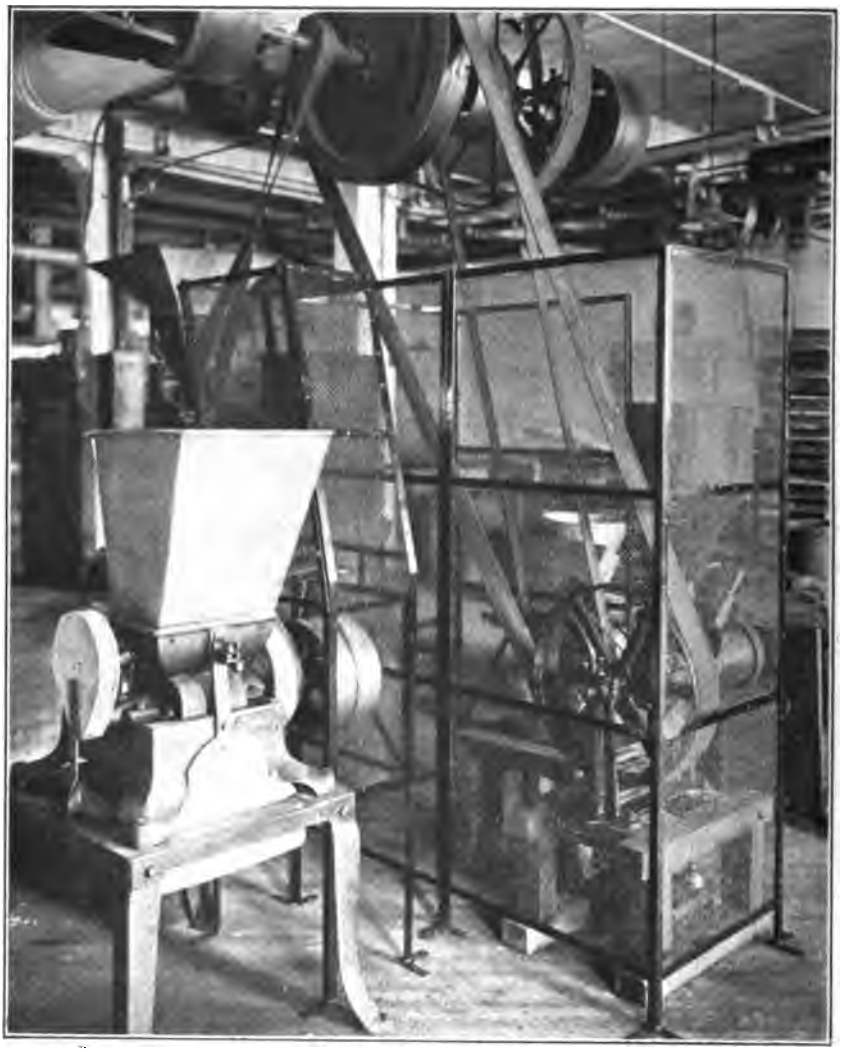


Fig. 1. Guarded Belt, Pulleys and Grinding Mill at a Formerly Dangerous and Congested Spot

Digitized by Google

Fig. 2. Method of Transportation Guarding and Lighting in the Cough Drop Department

Fig. 3. Box Making Department Showing How Saws, Slotters and Trimmers Have Been Arranged and Protected to Prevent Accidents

Digitized by Google

Fig. 4. Method Used to Light and Safeguard a Formerly Dangerous and Dark Row of Candy Kettles

Fig. 5. A Corner in the Cooking Room Showing Accident Preventive and Fire Extinguisher Precautions

Digitized by Google

Fig. 6. Recreation Room, Showing Pool Tables, Lunch Tables, Piano and the Girls' Coat Room. This Room, Occupying the Entire Second Floor of the New Addition to the Factory, Is Used for All Forms of Amusement and Recreation by the Employes

how they have initiated ideas to remove the other hazards existing.

In June, 1916, the problem was brought to the attention of the newly-formed general committee, whose duties were to supervise and pass on all safety work. This committee immediately authorized the appointment of Mr. Cook as safety inspector, and the appointment of a workmen's committee to assist and advise him in the work. By this method Mr. Cook surrounded himself with the best available talent, and started in to correct physical and organization hazards at that time existing.

The illustrations tell their story plainer than words, as to how the physical conditions were overcome. They show the different mills, power transmission equipment, kettles, and other equipment used in this industry; show how materials are transported, and how the lighting problem has been solved by artificial and natural illumination.

Realizing, however, that no equipment will earn money or accomplish results without attention from the organization and believing that a "safety man is the best safety device known," the organization for safety was made to include a certain amount of welfare work, as is evidenced by the recreation room. This recreation room is for the enjoyment of all employes. It is fitted with lunch tables, card tables, pool tables, books and periodicals, and is occasionally used for entertainments such as dances, vaudeville, employes' meetings, and speeches of all kinds, both instructive and amusing. Its effectiveness may best be indicated by the fact that on the opening night a house warming was held, which was attended by 400 of the 500 employes, and enjoyed to the utmost. It has promoted a feeling of fellowship and comradeship between employes and between employes and employer, which is most wholesome. It offers a common meeting ground for these two branches of the organization heretofore lacking.

The books and periodicals in this library are also available for library and home use by the employes. SAFETY ENGINEERING appears regularly on this table.

Digitized by Google

Another very interesting phase of the work is that of the workmen's committee, which committee accompanies the safety inspector once a month on his tour, and criticizes and advises him in regard to the practicability of the proposed work in regard to physical guards. Of course this committee gives its time free of charge and has adopted the slogan, "Once a member, always a member," the effect being that the guards which have been installed meet with the approval of the foremen and workmen of the different departments affected, the guards being used regularly and kept in good repair.

This committee also looks for unsafe habits and unsafe practices, and reprimands any individual whenever he is seen disobeying the fundamental principles of safe and sane living.

All departments are in close touch with what the other departments are doing, and a spirit of departmental competition in safety has arisen which is wholesome.

Each committee has for its principal duties the ascertaining and eliminating of accidents which usually result from carelessness and ignorance on the part of employes, and gives the newest and the most reckless employe the value of its mature experience in such a way as to be most valuable and acceptable to the newer and younger members.

On the whole, the work is most gratifying, and the returns therefrom are coming in in the form of reduced insurance premiums, increased output due to the more stabilized labor conditions, and a general feeling of good fellowship and co-operation which can only be obtained by fair dealing and due consideration of everyone connected with the plant in times of emergencies.

The plan is to extend this welfare work to the limit by installing at some future time a lunch counter which will supply the employes with wholesome and nutritious food at cost, and in all other ways to forward the activities of this department as the occasion demands, and as natural growth takes place.

Needless to say that while the safety and welfare department of this plant is the newest, it is also the most popular, and one of the best paying departments in dividends on the money invested.

New Safety Primer

THE Wisconsin Gas & Electric Company will try to teach the lessons of "Safety First" to the children of Wisconsin, and to this end will shortly begin the distribution of a booklet called "A Primer of Precaution." The primer is not an advertising plan, and its sole object is to inculcate into the minds of children habits of safety and to give them an idea of the perils of the open road. The booklet will not only be given to the school children, but its pages are to be printed one by one in various newspapers as advertisements carried by the gas and electric company.

S. B. Way, vice president and general manager of the company, originated the safety crusade, and the primer will be distributed in every city where the company has charge of the public utilities. The idea is to teach the dangers surrounding the operation of street cars, and give rules which will make a child's life safer. It does not seek to take away the pleasures of childhood, but it does seek to make those pleasures safer.

The primer is attractive and contains interesting pictures which will appeal to children. The text does not give statistics of lives lost nor children injured, but it tells just why children are injured under street cars, and warns children away from impending danger. The book is not given over entirely to the street car. It also warns children against playing in the streets, and tells of the dangers of the automobile.

Digitized by Google

Adequate Safeguarding of Elevators

By A. B. Cowfer

Safety Engineer, Ocean Accident & Guarantee Corporation, Philadelphia, Pa.

SUGGESTED wording of specification for locking device on elevators:

"Equip each elevator car and each landing door with an independent automatic locking device which will prevent any door of the hatchway being opened until the car has been brought to complete rest within three inches of (above or below) the level of any landing."

The device used must lock the stopping and starting mechanism before the door can be opened, must keep it locked while the door is open or until it is closed and locked again.

The locking device at each landing must be independent of all other landings and also of the car, so that the forcible opening of any door or damage to its locking device shall not affect any other door nor the proper operation of the car.

Statistics show that fully 85 per cent —possibly more—of all elevator accidents are due to negligence, carelessness or thoughtlessness. Few accidents are caused by defective machine parts and practically none by falling cars.

Fig. 1. No Interlock on This Door—and a Dangerous, Unprotected Hatchway

Fig. 2. Safety Made Certain—Equipped With a Standard Elevator Interlock

To reduce or eliminate the 85 per cent of avoidable accidents by attempting to reform human nature with all its lax and indifferent tendencies would seem a forlorn and hopeless task.

But to reduce this percentage by protecting all cars and elevator operation against the carelessness of the operators and the thoughtlessness of the public is altogether possible and practicable.

Elevator accidents—at least the 85 per cent which occur through neg-

Digitized by Google

ligence—arise from inadequate hatchway protection; from enclosure doors left ajar; from attempts of passengers to board or leave the car while it is in motion, and from the operators' haste in starting a car before the hatchway doors are closed and locked.

These are the accidents that tend to shatter one's confidence in elevator service. Yet they are the accidents which can be most easily prevented if not entirely eliminated.

Epigrams and Aphorisms, Old and New, on "Safety First"

By Geo. W. Bowie

American Car & Foundry Company, Bureau of Safety.

FOREWORD: It cannot be too often repeated that the real keystones of "Safety First" are the foremen in the various industries and engineering projects of the world. If foremen do not display real, continuous, intelligent interest in applying safety methods in the same spirit in which they exhibit their technical abilities, and in that manner lend the influence of their personalities, almost complete failure will be the result.

If a foreman loyally enforces *all* the rules and regulations of "Safety First," in his own immediate department, his corps of workmen will naturally follow his example. "Like master, like man," especially among the alien element. They will follow his example—*because it is set by their foreman.* That will bring immediate and good results to the plant and to the workmen, but more than that, it will call down upon the heads of departments (these careful foremen) the blessings of wives, mothers, children and other dependents, who will be happy to know that the foreman is doing his part to protect their protectors and providers. That is a benediction worth having!

How different is the position with the foreman, who, by his own suggestive attitude and methods, as well as by his unspoken but acted words, holds the whole program of "Safety First" up to ridicule, contempt and open neglect. He does not openly oppose it, but insidiously he leads his workmen to ignore it.

One of Addison's critics said of him and his suggestive attitude toward the work of another great writer, "He did not sneer himself but taught the rest to sneer." Just so, the foreman who is not in active sympathy with, or is in concealed opposition to "Safety First," instinctively teaches his men to silently disregard the very rules and regulations made by the management for their workmen's protection. What the foreman disregards or discredits the ordinary workman will soon despise. The foreman is the real keystone in the arch of "Safety First," extending from the management in the business office to the most obscure toiler in the ranks of the workmen.

The short and pointed sayings that follow—both original and selected—condense into themselves my own experience and observation, extending over years. They are conceived with the idea of gripping the thoughts of men and making them cling to their memories like limpets to a rock.

It is probably inevitable that accidents will occur under the very best systems of safeguards and security that men can devise. We must meet them as they arise, but the lamentable fact is that even now, with all our rules of "Safety First" nominally in force, at least 78 per cent of all accidents could be avoided—would be avoided—if workmen would faithfully follow these rules in spirit as well as in letter.

On looking over the returns from our own plant here for the past four months it is melancholy to notice that more than half of the eye accidents were caused because the workman did not wear his gog-

Digitized by Google

gles at his work. A still further proportion, being injured, failed to report at once to the doctor for immediate treatment.

Most other accidents, I notice, follow the same proportion. It is the hope that there may be something in the epigrams, if only in the manner of their expression, that will lead to a further substantial reduction of avoidable accidents that actuates my sending this article to SAFETY ENGINEERING.

SAFETY EPIGRAMS AND APHORISMS, OLD AND NEW

Safe conditions are all right—but *safe men are better.*

When you make a rule, *make a rule to keep it.*

The man who takes chances *is not a safe man.*

"Honesty is the best policy. *But the man who is honest from policy is not an honest man.*"

BE SOBER, BE SAFE, BE SANITARY.

The most trivial wound may have the *most serious consequences.*

Each foreman should constitute himself a *committee of one for "Safety First."*

Defective ladders are a *deadly danger.*

Avoid booze. "Safety First" means a clear mind, a steady hand, quick action in emergencies. *Booze impairs all three. Therefore avoid booze.*

Think and practice "Safety First" while at work. *Get the habit.*

Do not remove waste from your machine by hand. *Use a wooden spoon.*

Snugly fitting clothes are essential to safety. *Loose flowing ties are a danger and a snare.*

Save power. If your machine has no material to work on, *don't waste the power. Stop it.*

Even a good workman at his best makes a poor doctor. *So do not trust him. Rush the injured man to the factory hospital with all speed.*

Those who report their wounds immediately to the company's doctor recover quickly, *besides avoiding much needless pain, loss of time and money.*

Safety signs and rules are not for ornament, *but for use.*

Cleanliness and order and a place for everything are *essentials of safety.*

The man who removes a guard is *the man who must replace it.*

If you must smoke, *you must smoke outside, not inside, this plant.*

Remember: Safety saves *Sickness, suffering, sadness.*

A clean machine is an *important factor in "Safety First."*

Practical joking and wrestling are *entirely out of place in this plant.*

Don't point a pneumatic hammer toward anyone. *It might go off!*

Before letting steam into a boiler, *let the man out.*

Rules not kept are not worth the proverbial powder *to blow them to Hell.*

Disorder and dirt indicate *laziness and incompetency.*

Booze makes boozy men, of course. But the worst of it is, a boozy man is *a menace to Safety.*

A blind man has no earning capacity. *Save your eyes.*

Do not use mushroomed tools. *Nor keep your goggles in your pocket.*

Digitized by Google

Cleanliness, Safety, Efficiency *are the three Graces of all mechanics.*

Carelessness begets *cripples, blind men and misery.*

Show us an unsafe condition. *We will try to remedy it.*

Remember taking chances *is not "Safety First."*

Paderewski has his hands insured. *Insure your eyes by wearing goggles.*

Think "Safety First." *Let it be your middle name.*

Safety work means team work. *Will you help out?*

Two eyes are your birthright. Would you trade off one for a chance? No! *Then wear your goggles.*

You may defy the lightning like Ajax. That's easy. *But don't defy "Safety First" or you will get hurt.*

Broken rules have a boomerang effect. *They will avenge themselves.*

One thousand and sixty-nine lives lost! *Speed before safety sent the "Titanic" to the bottom.*

"Safety First," Safety Last. Look ahead before you've passed.

"Safety First" will save more lives than all the malignant *fevers kill.*

The foreman should be a fore-man in "Safety First." He should lead, be to the "fore." *Without his initiative all else lags.*

Electricity is the essence of life. Too much of it is the essence of sure death. *Don't monkey with a switch.*

Thou shalt guard thyself with all diligence. That is the first and greatest commandment of "Safety First." The second is like unto it. Thou shalt guard thy neighbor as thyself.

"Safety First" is more than philanthropy. *It has now become a vital fundamental factor in the economics of business.*

Monday accidents outnumber those of any other day of the week, 3 to 1. The explanation is simple. *Saturday drinking followed by Sunday boozing produces Monday accidents.*

The very A B C of "Safety First" is the foreman's attitude in the matter. *If he be O. K. all the others will be "all correct."*

Loyalty to duty demands that we as earnestly and continuously enforce the general manager's instructions for "Safety First," as we do his regulations as to production, quality and standards. *"Safety First" will help all these.*

Lord Shaftesbury, "The Good Earl," was practically England's first "Safety First" leader. He was decried as an iconoclast because he labored for rigid mine inspection and regulation. *But all the world now honors his name and pursues his methods, because they pay all round.*

"Trifles make perfection," said Canova the sculptor. But trifles, *such as torn gloves, ragged clothes, loose ties and outworn shoes are the immediate causes of many painful accidents.*

Digitized by Google

"The Man On The Job"

Prevention of Accidents by Education of Workmen, Methods of Management and Mechanical Safeguards

SAFETY ENGINEERING offers each month one First Prize of $10.00 *and one Second Prize of* $5.00 *for Articles relating to Industrial Accident Prevention. In case of a tie, the full amount of the prize will be paid to each tied contestant.*

No. 243 VARIOUS INDUSTRIES—THE INSPECTOR AND THE SAFETY EDUCATION QUESTION.—with the advent of the nation-wide movement for more safe practices in all branches of human effort, and consequently a general lessening of industrial accidents, there came also a problem that at the outset appeared gigantic in size. Even now it requires more than an algebraic expression to solve, namely, the education of all classes to the urgent need of heeding more closely the dictates of even common safe practices.

The matter of educating the general manager, superintendent, foreman, and the workman, to say nothing of the general (more or less) disinterested public, has reached a point that clearly indicates that all words and printers' ink have not been used in vain.

The writer wishes to bring out forcibly the fact that there are but a few things that man cannot accomplish. These few feats, were it possible to perform them, would net nothing. So then, if practically all things are possible of successful operation, it but remains to concentrate all efforts toward the greatest feat yet to be completed, the conservation of human life and limb.

In many plants that the writer has visited in the capacity of safety inspector, the statement has been made by those in charge, "Why should I or we (as the case might be) go to the expense of covering up every danger spot in the plant, when I (or we) carry an accident policy which covers every employe under the roof?" Does this man need education? He does, answering my own question. Thousands of them need enlightenment on more than one subject. To the man or men who put this question to me, I, in turn, ask them, "Do you care to have an accident in the plant? Even though you do carry a compensation policy that compensates the unfortunate individual?" Of course the answer readily comes to this, "Oh, no, we don't want to see anyone hurt." With that single statement he is endeavoring to mix oil and water. It takes good plain argument, forcibly presented, on the part of the inspector to bring these unenlightened men to a point where they will clearly understand and appreciate the full value of sound limbs and eyesight.

ON METHODS OF INTRODUCING MEANS OF SAFETY EDUCATION

There are many phases of this situation, and several conditions that must be considered, chief among them being: The size of the plant, figuring this upon the number of employes basis; the prevailing nationality of the employes, and the degree of intelligence of the man or men under whom the rank and file toil.

Even though the foreman may be a man of keen intellect, it is possible that on the question of speedy, and at the same time safe, operations he is lacking the knowledge that he should possess. In the education of this one man, and once he emerges from the dark and conceives the right idea along safety lines, we have accomplished much toward ultimate general safety in the plant where he reigns.

Illustrative cases of bad accidents must be brought to his attention, by means of views, clippings and, if possible, cases that have occurred near his plant. Advise him where to secure periodical bulletins. Take the time and pains to walk through the plant with him and point out the different men that are doing this or that in a manner that might some day lead them to the ambulance.

Digitized by Google

He will soon begin to see that there is something more in life than simply producing at the lowest possible cost. He in turn now takes matters to the office; coming from him, the general manager pays a little more heed than he would perhaps to others. When the foreman asks for a requisition for this or that in the way of material to make a guard for the punch press, he gets the order to go ahead. It may be that the order to proceed is given grudgingly, but he has the guard made, and later on sees another point that requires a guard, and so on. The foreman should be told that he is in himself an inspector, without waiting for the insurance or State man to appear. He only needs instruction to place him in a position whereby he can readily see a bad spot and seeing it means to remedy it.

Emery Wheels and Casting Chippers.—Notices should be posted over all emery wheels, and in as many languages as there are operators. These notices should state in a few words that the management requires the operator to wear the glasses furnished by the company. This should also apply to all casting chippers. Another notice that is worth its weight in gold, is the one which states that no employe shall oil, adjust or repair any machine while in motion, under penalty of dismissal. Here is where the new, educated foreman comes in, for he sees to it that these notices are lived up to.

Goggles.—The most common complaint in all plants where goggles are used is that the glasses steam up when the man perspires. He then puts the glasses aside with an exclamation of disgust, returns to the naked eye plan and incidentally, to the house of human repairs sooner or later. We will allow that the goggles steam up, but when a few seconds will dry them ready for use again why should any sane man thrust them aside as useless? The management must be reached closely on this one point and once they see the real need of more strict attention to this single item in the plant, co-operation between the management and the men will be but a matter of a little time.

Monthly Discussions.—The "safety round table" monthly discussion has done a great deal for more safe working conditions, but there are not enough of them. To increase the number the inspectors must at all times be in a position to give at first hand complete information as to the methods of forming and conducting the meetings. The inspector should hold himself in readiness to at any time speak before gatherings of workmen. This feature acts as a wonderful stimulus to those who are unable to do more than listen. Great care should be exercised by the speaker to frame his remarks in plain language, to cite cases near the city or town where he is speaking, to endeavor to hold his auditors in close attention and to get them in happy frame of mind at the start. All these matters given attention, his words will strike home more deeply.

In Conclusion.—The inspector must show the management that he is at the plant as a friend of all and not to make complaints. That he must be a thorough mechanic himself goes without saying, for he may be called upon any moment to show just how this or that should be done in the best and most economical manner. Drawings in the rough are often necessary; he should be able to make them. Leave the plant with everybody your well wisher. This can be done only by practicing what you preach. To walk past a board with an upturned nail in it, when in company with the foreman or master mechanic, and not stop to bend the nail down, would certainly be a wide breach of your own argument. In hundreds of ways to the future education of the men who are all attention to excessive production and have no time to investigate or see safety, the factory inspector can be the stepping stone to a universal state of safety that will stagger if not knock down the 100 per cent mark, not alone in the United States, but all over the earth wherever a wheel transmits power.

❦ ❦ ❦

No. 244 CHEMICAL INDUSTRIES—DANGER IN ENTERING CHEMICAL TANKS.—As a result of several deaths which have occurred in various chemical establishments, atten-

Digitized by Google

tion has been directed to the practice of employes entering chemical tanks without proper facilities being used to rescue them in case they become overcome with fumes. Notwithstanding the fact that rules to this effect are generally in force, employes frequently enter chemical tanks to make repairs without seeing that the fumes have been removed, or without protecting themselves by having a fellow workman equipped with a life-line at the manhole. As a result of this practice three workmen recently lost their lives entering tanks which had contained benzol. The circumstances in these cases were so similar that it seems advisable to call attention to the danger. Under no circumstances should any employe be allowed to enter a tank which has contained chemicals of any kind, which give off asphyxiating fumes, unless the tank has been thoroughly washed, steamed and blown out with air. In addition, the precaution should be taken of having a life-line attached to him and held on the outside by a fellow employe. The workman who is obliged to enter the tank should be also required to wear a respirator.

If these precautions had been observed the three men mentioned above would be living today. Unfortunately, however, the men seem willing to take a chance, and it is necessary that the managements of chemical concerns should absolutely prohibit any man from entering a tank to clean or repair it unless he has taken the precautions described. Inasmuch as the manufacture of benzol is increasing yearly, it might be well to call attention to the dangers from the fumes of this product. The three men who were killed by benzol fumes died under almost similar circumstances, although the accidents occurred in various sections of one of our States. A brief description of one of the accidents answers almost in detail for the other two.

The tank which the man entered had been washed in the usual manner, but there still remained a slight odor of benzol. Without thinking of the danger the man entered the tank and proceeded with his work. After a short time he felt some slight effects of the fumes and crawled out of the tank and sat down on the ground outside. In a few moments he fell over unconscious and never recovered. In each case the circumstances were practically the same, clearly demonstrating the insidious action of fumes of this kind.

Owing to the fact that very little of this material has been manufactured in the past, practically no literature can be found on the subject regarding the dangers of the fumes of this material. Therefore it is thought best to call attention in this way so that other persons may be warned of the danger, and managements where such material is manufactured may do their utmost to prevent employes from entering tanks where this material has been kept until all the necessary precautions have been complied with.

The same suggestions and recommendations hold good for any class of chemical tanks where material has been stored or has been used, the fumes of which would cause asphyxiation to any employe if inhaled in any quantity.

❦ ❦ ❦

No. 245 ALL INDUSTRIES — SAFETY AND EFFICIENCY.—The Man On The Job, in the writer's opinion, exists where efficiency is the watchword.

In the word *efficiency* we find "Safety First" playing a leading part with perfect output, steady work and entire harmony between the employer and employes.

Better wages and better surroundings are results usually found where "Safety First" is doing its part. With The Man On The Job and all employes falling in to do their part, it will create an efficiency where all are well paid in advance and at all times. This is the reward of "Safety Engineering."

❦ ❦ ❦

No. 246 ALL INDUSTRIES—CO-OPERATION. — Co-operation is the keystone in the arch of really effective accident prevention work. Whether the plant be large or small, the attitude of the man at the top is certain to be reflected in the work of the safety inspectors.

Digitized by Google

Every machine operator and every man engaged in work which is hazardous to himself is imbued with the idea of self-preservation. No man, except in rare cases, will intentionally do harm to his own person.

Many men will be careless of the safety of their fellows. To the foreman, to the superintendent who perhaps has graduated from the ranks, and to whom machine operations mean production, must be given the burden of real safety work. They must co-operate; they must play safe. Without their aid and their enthusiasm the accident prevention campaign in the ordinary shop must fail.

Many efforts have failed in the past, and many more will fail in the future, because the man at the top spent his energy in the organization of his staff, but failed to co-operate in putting the ideas of his inspectors or safety committee into operation.

Recommendations made merely for form's sake are useless. Recommendations made but not acted upon are worse than useless. Only a few such are needed to take the ginger and enthusiasm out of the whole safety movement.

Carefulness in recommending, confidence in their leaders, and co-operation with the heads of the business will ensure a lasting and effective campaign of accident prevention and avoidance of injury.

❦ ❦ ❦

No. 247 ALL INDUSTRIES—CARELESSNESS AND THOUGHTLESSNESS. — Regardless of how completely a plant may be equipped with mechanical safeguards, accidents will continue to occur. A large, if not the largest, proportion are due to the two greatest obstacles with which those interested in accident prevention have to contend: Carelessness and thoughtlessness. Only by education and organization for safety can this condition be overcome or minimized to any degree.

The employe must have firmly implanted on his mind the safety habit, care and caution at all times and all places. Only when this is accomplished will the willingness to "take a chance," even in apparent danger, be eliminated.

In the daily reports received of accidents the cause given in most cases is that the injured failed to be cautious, was careless—thoughtless.

The solution of this most potent hindrance in accident prevention requires considerable thought and action on the part of those having charge of the safety work. The need for a thorough and systematic education of the employes along safety lines cannot be exaggerated, and the solving of this part of the problem is difficult.

After the management has put the plant in good condition, machinery and buildings, as to safeguards as well as light and ventilation, then the human element must be educated, trained and disciplined.

Those in authority should impress upon the employes that it is the company's determined purpose to eliminate or greatly reduce accidents. Rules should be adopted and rigidly enforced governing carelessness, horse-play and fooling. The violation of these rules and regulations should receive severe reprimand or instant dismissal from service, according to the nature of the offense, regardless of who the culprit may be.

The workmen should know or be shown that the natural and unavoidable dangers connected with his work are great enough, and that careless acts on his part often, quite often, result in injury not only to himself, but to the other fellow, and that he and they are the ones most vitally interested in the practice of safety habits; for upon them fall the penalties—hours of suffering, loss of wage, eyes, limbs, and not infrequently loss of life.

Carefulness means playing safe. The safe workman is the efficient workman —the better citizen.

Only by the elimination of the careless, the indifferent, the chance-taking habit, and acquiring the careful, cautious "Safety First" habit will accidents be materially reduced.

❦ ❦ ❦

No. 248 ALL INDUSTRIES—THE FOREMAN'S RESPONSIBILITY. —In the whole domain of "Safety First" there is probably no one

Digitized by Google

subject that has occasioned so much discussion as the statement—"A foreman is responsible for the safety of his men." The term "foreman's responsibility," when it applies to accidents, is often misunderstood by the foremen. Moreover, its meaning cannot be acquired at once; even an extended definition would not give its true import. Foremen readily understand that they are responsible for the work their men are hired to do, but when safety is mentioned they find it hard to follow the idea.

I am convinced that some of the foremen at this plant think the impossible is expected of them when they are told that they are accountable for the accidents occurring on their shifts. There is probably no greater drawback to a cause than to dampen enthusiasm by placing seemingly impossible conditions on those depended upon for results. The notion of impossibility must be corrected. If the ideas advanced here will let a little light in on the subject the writer will feel well paid.

In order that the foreman's relation to his men, to their work and to their safety may be more easily understood, let us take a concrete example and suppose the following case: John Smith, foreman of the masons, needs a man and hires Sam Ross. It may be well to emphasize the fact that Smith, the foreman, is the one who does the hiring—no one else has anything to do with it. Smith uses his judgment to select a workman able and willing to do the work. Foreman Smith is responsible for the kind of work Ross does. The superintendent expects every man to do a fair day's work. Foreman Smith knows this and knows he will be held responsible by the superintendent for the amount of work done by his men. He never thinks to question such responsibility, for he knows he assumed the responsibility of a foreman's position with that understanding—it is an unwritten, undisputed law. In order that he may turn out the proper amount of work in his department, Foreman Smith sees that his men have a supply of material to work with, that they have proper tools, that their tools are in good condition. If a man fails to do his work the foreman finds out why. If a man is sick he sends him to the doctor. It may be that the man needs to be disciplined a little, and the foreman lays him off for a short period, hoping that the correction will stimulate him to better endeavor. However, when the man shows himself lazy or incompetent the foreman, in order to maintain the efficiency of his department, must discharge the man. Again, let us center our attention on the fact that all the action in this case is on the part of the foreman. He selects the worker, he watches his behavior, he administers remedies to correct faulty behavior, and when occasion requires he resorts to the extreme penalty. The foreman does all this for the simple reason that his superintendent holds him responsible for results, and the foreman must use his brain to bring about the desired results—namely, *work of a certain quantity and quality*.

To carry our illustration a little further, let us suppose that Foreman Smith is repairing a flue. He provides his men with scaffolds, ladders, bricks, mortar, etc., and sees that they have proper tools. These materials and the equipment are necessary to the accomplishment of his work, and, having a properly trained crew, he is ready to begin the job.

Now comes in the safety idea. Since the saving of life and limb and the saving of loss of time due to accidents have been shown to be so profitable to all concerned, the foreman is intrusted with the safety of his men, and is held responsible for accidents to them. Accordingly, he not only provides scaffolds, but sees that they are strong and safe. He inspects the ladders, he sees that the bricks are piled in a safe way and that the tools have good handles, the striking hammers good crowns, that the drills are without burrs, etc. Now he has made a start in safety work, but only a start. He has done the mechanical part of his safety work, but has done scarcely anything toward eliminating the cause of the majority of the accidents. In the course of his work he has to have some old concrete chipped away. While the men are doing this he notices that chips and dust are flying about. Being a good safety man, he suggests goggles. The workmen don't

Digitized by Google

like the idea of goggles, but since the foreman seems determined to have them protect their eyes, they try the goggles. After a few minutes' work one workman declares that it is impossible to work with goggles on. They "hurt his nose," his "cheeks sweat," and he "cannot see." Now a wise foreman will not force an untried arrangement on his men without thorough investigation, but he knows from observation that men in many places wear goggles while at such work. Possibly the foreman does not know it, but he is at a critical stage of his career. Circumstances now force him to show a strong hand, or lose the control of his men. As a man who is responsible for the safety of those men's eyes, he must insist on the men protecting their eyes, using his judgment in applying a new idea and showing patience along with his firmness.

In combating many forms of carelessness the foreman will be called upon to display considerable wit and resourcefulness. Carelessness is due to mental lassitude — a half-awake condition of the mind—and a foreman must constantly encourage alertness, carefulness, on the part of his men to make them safe men. Suppose a foreman should admit that he cannot make his men work, or that he cannot control them, how long would he last? Nothing will demoralize a working force so quickly as to have the foreman deny his responsibility and admit his weakness. The foreman is the moral force behind his crew. From him they absorb the spirit of the work, be it bad or good. Men soon learn the temper of their foreman and to respect a strong man. Some foremen seem always to have the best men, to get out good work, things run smoothly in their department, they seem to have no troubles. What is the reason for this? Is it luck? No! You can bet it is not luck; it is plain and simple ability. A competent foreman naturally attracts good workmen, and poor workmen naturally avoid him. The foreman who begins to make excuses about not being responsible for the safety of his men is showing a weak hand. Just let the men hear a foreman say this and the careful men will try to get on some other shift and the careless ones will just as truly gravitate toward him. But let him assume the right attitude toward this subject and you will soon find that the men know it. The safe man will want to work for him—the careless one will be afraid to be under him. The moral attitude of a foreman will make itself felt among his men and in time the careless ones will be weeded out.

To be careful takes a little extra thinking. The careful man, the thinking man, is apt to be the most competent man, for his mind has been more awakened and is more active in all its functions.

At this plant, if you select the most competent foremen as regards work, you will have at once the foremen who are our best safety men.

❦ ❦ ❦

No. 249 ALL INDUSTRIES—THE EFFICIENT INSPECTOR.—It is a very simple matter to tell a man what to do in order that he may safeguard his plant against injuries to his employes caused both by fire and industrial hazards. But to get this same man to comply with whatever recommendations may be made is an entirely different task. The latter task is what reveals the real worth of an inspector.

To get the desired result it is necessary for a man to be just a little more than an inspector. He must be able to speak intelligently. He must keep well posted on the various hazards in various industries and be able to quote some serious accident which has occurred in a factory similar to the one he is inspecting. He also must keep himself as neat and clean as possible, if he wishes to make a favorable impression upon the man to whom he is talking or with whom he is dealing. A blue or black shirt with a celluloid collar does *not* help to make a good impression.

The writer has met many men who are termed inspectors because of their practical experiences in all lines which are necessary in order that they may go out and inspect a factory, an elevator and the like. But they seem to lack the tact to make the factory owner "come across" and comply with recommendations. I say that a man with all practical

Digitized by Google

experience and no theoretical knowledge is practically valueless to an insurance company.

The inspection made for the safeguarding of employes against industrial accidents in factories, etc., is, I dare say, the most important inspection work of the present day. What should be done to safeguard any factory is a simple matter, having been made simple by the compilation of books of standard guards to which an inspector can refer in nearly every case while inspecting a factory. At the same time he can show the mill owner from the drawings in the books of standard guarding just how the hazards can be partially, if not entirely, eliminated. Therefore, I say that it is not necessary for one to be a practical machine hand in order to state just what style of guarding would apply to a certain hazardous condition. Again, the safety engineer and the machine operator, in sizing up a machine from a safety point of view, do not see this machine in the same light. The machine operator or practical man who has operated this machine day after day will overlook many dangerous points on the machine. He is a careful man, and he does not see how any person can meet with an accident since he himself has not met with one.

On the other hand, the safety engineer or theoretical man will set to work and guard every part of the machine on which there is the slightest danger of being injured.

It is understood that all accidents are caused through someone's carelessness. A careful man will never meet with an accident unless it is caused through someone's carelessness. If it is caused through neglect or some risk of his own, he naturally ceases to be a careful man. It is the careless person, and the careless person only, with whom we are dealing when we teach "Safety First." The man with sufficient tact to make a careful man out of a careless man and the man capable of using enough diplomacy to induce a factory owner to safeguard his plant against any possible injuries to the careless employes, and, at the same time, make the employer feel that he has done a great deed benefiting everybody concerned, is the man who can call himself an inspector.

Prizes for September Articles

Owing to the early closing of the forms of the October number of Safety Engineering in order that the edition may be circulated at the Fifth Annual Congress of the National Safety Council in Detroit, October 17-20, announcement of prizes for September articles will be made in the November number.

Digitized by Google

Literature of Safety

ACCIDENT PREVENTION

National Safety Council. Secretary Cameron's Third Report of Progress. Saf. Eng., August.

Hand Rail and Screen Protection. New York Edison Company's Standard Hand Rail and Screen Protection on Rotary Converters. Saf. Eng., August.

Manufacture of Gasolene and Benzene-Toluene from Petroleum and Other Hydrocarbons. By W. F. Rittman, C. B. Dutton and E. W. Dean. Bibliography compiled by M. S. Howard. U. S. Bureau of Mines.

"The Man on the Job." Prevention of Accidents by Education of Workmen, Methods of Management and Mechanical Safeguards. Saf. Eng., August.

The Modern Hospital. "Special Industrial Welfare" number. Containing accounts of welfare work and health conservation in various industrial companies in the country. August.

The Statistician or Rate-Maker. His Duties in Employers' Liability and Workmen's Compensation Insurance. By A. C. Hendrick. Saf. Eng., August.

Industrial Conditions in Springfield, Ill. A survey by the Committee on Women's Work and the Department of Surveys and Exhibits, Russell Sage Foundation. Russell Sage Foundation, New York City.

The Explosion at Black Tom Island, July 30. Saf. Eng., August.

Scientific Management in Industry and What It Includes. By Dr. George M. Price. American Journal of Public Health, August.

Physical Examination of Employes. By John B. Andrews, secretary, American Association for Labor Legislation, American Journal of Public Health, August.

Central Safety Stations in Coal Mines. By H. M. Wilson, Director of Department of Inspection and Safety, The Associated Companies. Saf. Eng., August.

Fatalities and Injuries in Pennsylvania's Industries during First Five Months of 1916. Bulletin of Dept. of Labor & Industry, Harrisburg, Pa., July.

Health Conservation at Steel Mills (Synopsis). By J. A. Watkins. U. S. Bureau of Mines.

Safety Work in Gas and Electrical Industries. Saf. Eng., August.

The Analysis of Permissible Explosives. By C. G. Storm. U. S. Bureau of Mines.

Railroad Safety Committees. By G. B. Cooley, Pittsburgh & Lake Erie R. R. Saf. Eng., August.

"Safety First." By David Ross. Labor World, August 31.

Black Tom Explosion, July 30, 1916. Illustrated pamphlet. Mississippi Wire Glass Co., New York City.

Construction and Operation of a Single-Tube Cracking Furnace for Making Gasoline. By C. P. Bowie. U. S. Bureau of Mines.

Safety Devices for All Industries. Saf. Eng., August.

Production of Explosives in U. S. during 1915, with notes on coal-mine accidents due to explosives. List of permissible explosives, lamps and motors tested prior to June 1, 1915. Compiled by A. H. Fay. U. S. Bureau of Mines.

Coke-Oven Accidents in the U. S. during 1915. Compiled by A. H. Fay. U. S. Bureau of Mines.

Taking Annual Inventory of Accident Hazards. Saf. Eng., August.

What Has "Safety First" Really Done? A condensed survey of what has been accomplished in the prevention of accident on the Norfolk & Western Ry. since the inauguration of the safety movement. Office of Safety Commission, Roanoke, Va.

Safety First Slogans. Compiled by the Public Safety Commission of Chicago and Cook County, Ill. Bulletin of the American Museum of Safety, July.

First Aid Equipment. Saf. Eng., August.

Lineman's Safety Shoe. National Electric Light Association Bulletin, July.

Apparatus for Applying Electrical Tests to Rubber Gloves. National Electric Light Association Bulletin, July.

Working Models for "Safety First" Demonstrations in Kansas. Saf. Eng., August.

Black Damp in Mines. By G. W. Burrell, I. W. Robertson and G. G. Oberfell. U. S. Bureau of Mines, Washington, D. C.

Report on Explosion of Ammonia Refrigerating System, July 13, 1916. Butcher Shop and Dwelling, 414-422 Sumner Ave. and 339 Macon St., Brooklyn, N. Y. Bureau of Surveys, New York Board of Fire Underwriters.

The American Society of Safety Engineers. Saf. Eng., August.

Report on Ammonia Explosion, 145-147 Waverly Place, New York City, July 19. Bureau of Surveys, New York Board of Fire Underwriters.

Explosives—Transportation and Storage. Bureau of Surveys, New York Board of Fire Underwriters.

The Need of Safety Supervision. Saf. Eng., August.

Determination of Standards for the Atmospheric Dust Content in Factories and Work Shops. An investigation conducted by the American Museum of Safety. By H. C. Ward. Bulletin of the American Museum of Safety, July.

Digitized by Google

Piping for Steam-Generating Plants from a Safety Point of View. Important points to be observed in the installation of piping systems. Travelers Standard, August.

Prizes for Safety Co-operation. Saf. Eng., August.

Safety and Higher Efficiency. Two prominent factors, mechanical equipment and the "human element." Travelers Standard, August.

Safety Devices for Plunger Elevators. Saf. Eng., August.

Carbon Monoxide from Air-Compressors. Dangers to be guarded against in the use of compressed air. Travelers Standard, August.

The Man on the Job, His Brother's Keeper. Saf. Eng., August.

Accidents at Railway Stations. A variety of accidents likely to happen at passenger stations or on trains through carelessness of travelers. Travelers Standard, August.

Industrial Hygiene and Disease. By E. R. Hayhurst, M. D. Pointers for the Factory Manager on Maintaining Health Efficiency. Industrial Canada, April.

Safety Work on the Part of the Employer. Saf. Eng., August.

Safety Standards of Pa. Indus. Bd. Boilers—effective in Pa. July 1, 1916. Bulletin of Labor & Industry, Harrisburg, Pa., July, 1916.

The Importance of the Prevention of Industrial Accidents and Occupational Diseases. By Francis D. Patterson, M. D. Bulletin of Dept. of Labor and Industry, Harrisburg, Pa., July.

Failure to Prevent Industrial Accidents. Saf. Eng., August.

Coal-Mine Fatalities in U. S. June, 1916. Also list of permissible explosives, lamps and motors tested prior to July 31, 1916. U. S. Bureau of Mines.

The Physician and the Prevention of Industrial Accidents. By Herbert J. Cronin, M. D. Boston Medical and Surgical Journal, June 15.

The Decalogue of "Safety First." By T. J. MacMahon, American Car and Foundry Company. Saf. Eng., August.

Stamping and Punching Presses. Types of machines with illustrations and descriptions of proper guards. Utica Mutual Compensation Insurance Corporation, Utica, N. Y.

Let Us Learn Self Preservation From Prehistoric Man. Saf. Eng., August.

Coal-Mine Fatalities in the United States. Monthly statement for May, U. S. Bureau of Mines.

Accidents That Could Have Been Prevented. By J. L. Douglas, United Gas Improvement Company. Saf. Eng., August.

Analysis of 1915 Accidents in Pennsylvania Industrial Plants. Bulletin of Dept. of Labor & Industry, Harrisburg, Pa., June.

Accidents Caused by "Man Failure." Saf. Eng., August.

Timely Hints for Tinners. Bulletin of Dept. of Labor & Industry, Harrisburg, Pa., June.

Avoidable Accidents. Bulletin of Dept. of Labor & Industry, Harrisburg, Pa., June.

Improved Safety Code for Foundries. Saf. Eng., August.

How Accidents Occur in Connection With Elevators. Bulletin of Dept. of Labor & Industry, Harrisburg, Pa., June.

Proper Protection From Molten Metal. By F. W. King. Saf. Eng., August.

Latest Features in the Diagnosis and Prevention of Some of the Occupational Diseases. By W. H. Rand, M. D. American Journal of Public Health, August.

A Woman's View of "Safety First." Saf. Eng., August.

Discharge Pipes for Safety Valves. Travelers' Standard, April.

Paper-Box Manufacture. Travelers Standard, April.

Accidents to Pedestrians. Travelers Standard, April.

The Real Meaning of "Safety First." By John Annal, Safety Inspector, Aetna Life Insurance Company. Saf. Eng., August.

Piling Lumber. Travelers Standard, April.

Instructions to Employers. Bulletin of Dept. of Labor & Industry, Harrisburg, Pa., June.

How Many of These Accidents Have Happened to You? Illustrated bulletin. Bulletin of American Museum of Safety, September.

Sound Your Bell at Street Crossings. By T. A. Cross, General Manager, United Rys. & Elec. Co., Baltimore. Bulletin of American Museum of Safety, September.

Sanitary Requirements for Wash and Locker Rooms. (By the Sanitation Committee of the U. S. Steel Corporation.) Bulletin of American Museum of Safety, September.

Safety-First Truck: Type Switchboards. Electrical Review & Western Electrician, August.

FIRE PREVENTION

"Firebrands." 219 pp. By Frank E. Martin and George M. Davis. Written in the interest of fire waste and fire prevention as a "supplementary school reader for pupils of the 4th and 5th grades." Little, Brown & Co.

Fire Prevention and Juvenile Workers. Address by Miss Mary McDowell. National Fire Protection Association.

Some Fire Causes and Their Prevention. By Robert Palm. Some principal causes of fires in industrial plants and practical suggestions for remedying conditions. Industrial Canada, August.

Hartford, Conn. Underwriters report on fire department, structural conditions, fire hazards, etc. National Board of Fire Underwriters.

Somerville, Mass. Underwriters report on fire department, structural conditions, fire

Digitized by Google

hazards, etc. National Board of Fire Underwriters.

Fire Hazards of Ammunition Manufacture. By W. B. Milne, Inspector, Underwriters' Bureau of New England. Saf. Eng., August.

Dangers from Oil Lanterns for Emergency Use. Saf. Eng., August.

Fire Marshal's Association of North America and the International Association of Fire Engineers. Article by Walter H. Bennett, president of Fire Marshal's Association, pleading for greater efforts toward fire prevention rather than expending vast sums for fire-fighting equipment. Fire Engineer, August.

The Power to Order Structural Changes in New York Factory Buildings. Saf. Eng., August.

Electrical Data, August, 1916. Underwriters' Laboratories.

The Bureau of Fire Prevention in the City of New York. Report by Joseph O. Hammitt, Chief of the Bureau of Fire Prevention. Saf. Eng., August.

Lectures on Fire Insurance, 1915-1916. A Comparative View of Rating Schedules. By Gayle T. Forbush. Insurance Library Association of Boston.

Some of the Causes of Storehouse Fires. Account of several fires among railway stores and the cause of each, with a warning. Railway Review, August.

Hospitals Poorly Guarded From Fire. Large city institutions generally well built, but safety equipment is lacking. Small town institutions as a rule have many hazards. Fire Protection, July.

Publication by insurance commissioner of North Carolina regarding fire shutters, metal frames and wire glass, and inspection of basements. Twenty-seven warning signs (fire and accident) for free distribution in the State. Ins. Dept., Raleigh, N. C.

White Plains, N. Y. Report by National Board of Fire Underwriters.

Who Pays the Fire Tax? By M. J. Cleary, State Fire Marshal, Wis. Bulletin of American Museum of Safety, September.

Shingle Roofs as Conflagration Spreaders. An appeal to the civil authorities and civic and commercial bodies. National Board of Fire Underwriters.

Timely Hints for the Prevention of Fire. Bulletin of Dept. of Labor & Industry, Harrisburg, Pa., June.

A Manual of Fire Prevention and Fire Protection for Hospitals. 69 pp. By Otto R. Eichel, M. D., Director, Division of Sanitary Supervisors, N. Y. State Dept. of Health. John Wiley & Sons, Inc.

Fire Prevention Bulletin, No. 2. By Harvey Wells, Insurance Commissioner of Oregon.

Underwriters' Laboratories. List of Inspected Mechanical Apparatus. July.

Notes on Automatic Sprinkler Protection. By Gorham Dana. Bulletin Insurance Library Association, Boston, July.

Report on Fires by the Detective and Fire Inspection Dept. of the Massachusetts District Police. Year 1915. Commonwealth of Massachusetts.

Fire Department, City of New York. Annual report, 1915.

SAFETY ENGINEERS' SCRAP BOOKS.—Complying with numerous requests, Safety Engineering has arranged to supply loose pages of Safety Engineering for scrap book purposes beginning with the October number. For articles of three pages or more, remit at the rate of five cents a page when sending order. For articles of three pages or less, remit fifteen cents. Address all orders to Editorial Department, Safety Engineering, 80 Maiden Lane, New York.

Digitized by Google

MATERIALS, APPARATUS, PROCESSES

IN THIS DEPARTMENT APPEAR REVIEW-ARTICLES ON PRODUCTS WHICH CONSERVE LIFE AND PROPERTY. THIS INFORMATION IS SECURED LARGELY FROM MANUFACTURERS. WE ACCEPT NO PAYMENT FOR ITS PUBLICATION

INCREASING THE USE OF FIRE EXTINGUISHERS.

The Pyrene Mfg. Company, New York, reported that a large increase each year has taken place in the demand for Pyrene extinguishers. In 1910 this company sold 17,835 extinguishers and in 1915 the sales totaled 285,664, and it is estimated that Pyrene sales will reach 400,000 for 1916. This is encouraging to all fire preventionists, as it indicates public interest is being roused to the necessity for having on hand fire fighting appliances. It is now becoming customary for motor boats and automobiles to carry a hand extinguisher.

Insurance companies make a reduction of 15 per cent on automobiles equipped with this extinguisher and some insurance companies will not insure a motor boat without fire extinguishers.

NEW HARDY SHOP CAP.

F. A. Hardy & Co., 10 S. Wabash Ave., Chicago, are announcing a new shop cap for industrial workers which they will have on exhibit at their booth at the Detroit Safety Exhibition. Particulars of this new shop cap will gladly be sent on request by F. A. Hardy & Co.

PREVENTING ELEVATOR ACCIDENTS.

Each year elevators take a heavy toll of life and limb, and as long as the great proportion of elevators are not equipped with safety devices we must expect a large number of serious and fatal accidents.

It is time that employers no longer permit their elevators to be operated without a safety stop. A reason why more elevators are not equipped with safety devices is that it takes longer to operate a car with a safety device than without. Well, suppose it does take a few seconds longer. What is that compared to a human life or limb? The objection of elevator operators against a safety device on the elevator is time. In the first place the elevator operator is not the proper party to pass judgment upon the advisability of equipping the elevator with a safety device. He is paid to operate the elevator and is in no sense a safety expert. The employer, safety inspector and building owner are the proper parties to decide this question. No reasonable man, whether he is a safety expert or not, can argue that a few minutes of time is of greater importance than the safety of many lives and limbs.

The Angell Elevator Lock Company has placed on the market a lock system for elevator shaft doors which has received the approval of Labor Department, Compensation Insurance Companies and Industrial Safety Experts. This device is a positive accident preventer on both freight and passenger elevators. Its operation is such that an elevator door must be closed and latched before the car can be started.

INCREASE IN DEMAND FOR WIRE GLASS.

The Pennsylvania Wire Glass Co., Penn. Bldg., Philadelphia, reports a steady increase in the demand for its various brands of wire glass. Industrial safety officials can well consider the use of wire glass in industrial buildings.

It not only is a reliable fire retardant but has qualities of strength and resistance which make it far superior to ordinary glass, and in industrial safety campaigns wire glass will come into greater demand as its qualities become better known among industrial safety officials.

SAFETY FIRST PAPER.

The importance of selecting a high quality paper for records is another wise application of Safety First practices. Records are at times important for reference after a long period of years during which time they may have lain in a vault or safe. It is of the utmost importance that the records are permanent and are clearly legible when needed. A poor quality paper discolors and deteriorates, making the record indistinct and sometimes so faded that it is impossible to decipher it.

The L. L. Brown Paper Company of Adams, Mass., has specialized for many years

Digitized by Google

in the manufacture of high quality ledger papers such as are needed for permanent records. By specifying Brown's Linen Ledger Paper for all important books precaution is taken against the decay hazard.

NEW SAFETY DEVICES.

The Multi-Metal Separating Screen Company, 62 East 131st Street, New York, has recently placed on the market a number of safety devices for the protection of foundry and other industrial workers.

The Pulmosan devices include sand blast helmet, dust hood, respirators, acid mask, babbitt mask, chipping mask, welding mask, furnace mask, wire goggles and special helmets. The safeguarding of workers subject to fumes, dust and other poisonous conditions is now receiving the attention of safety officials and in order to meet the requirements for proper protection the Multi-Metal Separating Screen Company has perfected its line of Pulmosan Safety Devices. A catalogue describing these various devices will be sent upon request.

ELEVATORS—HYDRAULIC AND ELECTRIC.

A new hand book of working rules, formulas, questions and answers about elevators, for the use of Engineers, Inspectors, Mechanics, Operators and Students.

A knowledge of the mechanism and construction of elevators undoubtedly tends to increase safety in the operation of elevators. The object in this small book has been to condense information and put it in language that both an engineer and a layman can understand. For convenience the book is made of a size which can readily be slipped into the pocket.

A NECESSITY IN FIRE PROOF CONSTRUCTION

In analyzing causes of the huge fire loss which this country suffers each year, the fact is disclosed that exposure hazard is a serious one and should not be overlooked. The importance of providing adequate protection against fire entering a building through windows from an adjacent building calls for wire glass windows set in approved metal frames. The value of high quality wire glass as a fire retardant is well known to every experienced fire preventionist.

Wire glass windows can be instantly closed and present a solid surface with no openings for flames or draughts. Wire glass is translucent and resists rust. The Mississippi Wire Glass Company, 222 Fifth Avenue, New York City, manufacturer of wire glass on a large scale, has prepared bulletins explaining many advantages of wire glass windows as fire retardants. Copies will be sent on request.

EVANS "ALMETL" FIRE DOORS AND SHUTTERS.

The Evans "Almetl" Fire Door consists of a panel of standard heavy gauge corrugated galvanized steel, transversely laid and interlined with asbestos roll board, the whole being securely held in a continuous frame of 3/16" x 2½" bar steel. All joints are welded—not riveted or bolted. Provision is made for expansion and contraction without distortion. The large, heavy, cross-laid corrugations give extreme strength, while omission of the heavy wood core gives one-third lighter weight than ordinary doors. The large air spaces in the corrugations, supplementing the thick asbestos give maximum resistance to heat.

The Evans "Almetl" Fire Doors and Shutters are claimed, in design, material and workmanship, to be superior to all other types of fire doors on the market. They are fully approved by the Underwriters' Laboratories, Inc., Chicago, and the Factory Mutual Laboratories, Boston, and are manufactured exclusively by Merchant & Evans Company, Philadelphia, who will send illustrative and descriptive circulars free upon request. This company has works, offices and warehouses in principal cities, and over 150 contracting and erecting fire door licenses throughout the country.

WIRE GLASS WITHSTANDS VIOLENT SHOCK.

The terrific Black Tom Island Explosion, a few weeks ago, was a most strenuous test of the resistance against shock of buildings in the vicinity of the explosion. Glass windows were shattered for a distance of many miles from the scene of the explosion, the shock being sufficiently violent to shatter ordinary glass windows at such points as New York City, Brooklyn, and considerable distances in other directions. It is very interesting to note the difference in resistance between wire glass windows in the shock zone and ordinary glass windows. In some buildings the ordinary glass windows were entirely shattered while the wire glass windows remained intact. In others where the shock was more violent, wire glass windows cracked but did not shatter and in some cases it is not even necessary to replace the cracked glass.

This explosion has conclusively demonstrated that wire glass is an even more valuable safety product than is generally supposed, for its primary function is to retard the progress of fire, but it is also a powerful shock resister, and in cases of violent shock to a building it holds firm and does not permit a shower of fine glass to descend, and thus it safeguards those in a building against the danger of falling glass particles.

Digitized by Google

FIRE RESISTIVE ROOFS

On various occasions SAFETY ENGINEERING has called attention to the dangers of a wooden shingle roof. A great number of buildings each year are destroyed because they are roofed with wooden shingles. This hazard is a serious one and should receive the attention of not only the owners and occupants of the building, but of the fire department and building department. Regulations should be specific on the point of not countenancing wooden roofs as they are a fire menace to any community.

The Keasbey & Mattison Co., of Ambler, Pa., has specialized for years in manufacturing roofing which is burn proof. This roofing is known as the Ambler Asbestos Century Shingles. These shingles are made of portland cement reinforced by asbestos fibre, neither of which products is a supporter of combustion. The manufacturer reports a large increase in the demand for asbestos century shingles, for they can be used not only for roofs, but also sidings of buildings. A building constructed of this material can never be destroyed by fire, and this should be reason enough for any one to specify this material. In addition to its fireproof qualities, asbestos shingle never needs painting or repairing and retains its appearance for great periods of time. Changes of temperature have practically no effect upon this material, frost, sun, wind and rain having as little effect as they would on a piece of flint. Another quality which is a distinct advantage in many types of buildings is that Asbestos Century Shingles are very light and can be applied to any good rafters.

The manufacturer will be pleased to furnish full particulars of Ambler Asbestos Century Shingles on request.

EFFICIENT FIRE ALARM SYSTEM

The automatic fire alarm is now becoming more generally known and its value appreciated. As every fire preventionist knows, in case of fire it is the first few moments which are the most precious, and this is the time when the fire can be easily extinguished if discovered. Fire spreads with amazing rapidity and few people realize what a short time it takes for a fire to get beyond the control stage, if it is not fought in the first few moments.

The Aero Automatic Fire Alarm System protects every part of a building and is sensitive to a rapid increase of temperature such as is caused by a fire. As soon as the warm air reaches the hollow Aero tubes a rapid expansion of the air inside takes place, which starts the fire alarm ringing, thus notifying that a fire has started. This fire alarm system, where installed, protects the building at all hours of the day and night against a surprise by fire.

Further particulars can be obtained from the Aero Fire Alarm Company, 26 Cortlandt street, New York City.

WAR DEPARTMENT A LARGE PURCHASER OF SAFETY GOGGLES.

T. A. Willson and Co., Reading, Pa., report that the War Department is purchasing their ALBEX Eye Protectors in large quantities and that within a few months 50,000 regular troops will be equipped with Willson Goggles.

Already 25,000 Willson Goggles (mostly Albex Eye Protectors) have been shipped to El Paso and other southern points for the use of National Guardsmen. It is evident that these goggles meet in a satisfactory manner the requirements of the War Department.

This manufacturer states that the large contract for goggles recently secured from the War Department is the first official order for Eye Protectors issued for the United States Military.

PREVENTING BOILER AND FLYWHEEL EXPLOSIONS

Every industrial safety official knows that an unguarded boiler is a most dangerous thing in any industrial plant, for when a boiler explodes it invariably does most serious damage both to life and property. One of the first duties of industrial safety inspectors should be to see that the boilers are equipped with safety devices which prevent the hazard of the boiler bursting.

Golden Anderson Valve Specialty Co., Fulton building, Pittsburgh, Pa., supplies Double Cushioned, Triple Acting and Non-Return Valves for the purpose of preventing boiler accidents. These valves open and close automatically, equalized pressure between boilers making back flow of steam impossible, absolutely protects workmen from being scalded, and instantly cuts off steam to defective boilers or ruptured steam pipes. Such protection as is afforded by these valves should strongly appeal to all those whose responsibility includes boilers.

REDUCING ELECTRICAL ACCIDENTS

The Krantz Mfg. Co., Brooklyn, New York, manufacturer of the Krantz Safety Electrical Apparatus, emphasizes the importance of the "human element" in industrial electrical accidents and has carefully considered the fallibility of the "human element" in the production of its safety electrical apparatus. The necessity of protecting all electrical live parts with which workmen can come in contact is shown by the following figures:

Out of 457 accidents in factories in New York state 63 were caused by electricity.

In the State of Wisconsin electricity caused more fatal accidents than anything else.

Digitized by Google

A NEW FIRE EXTINGUISHER

The Fyr Fyter Company, Dayton, Ohio, is now placing on the market a new hand fire extinguisher, "The Fyr Fyter," which has been approved by the Underwriters' Laboratories.

The value of the hand fire extinguisher is now being recognized as an instant means of fighting fire. Industrial Fire Preventionists and Safety Engineers, in fact, all those whose responsibility includes the safeguarding of life and property should give careful consideration to the fire hazard as well as the accident hazard. Many large industrial plants are now equipped with hand fire extinguishers at convenient points, and the large increase in the demand for chemical extinguishers is the best proof that both the public and employers recognize the wisdom of taking precautions against fire and fighting it in its first stage. Particulars of the Fyr Fyter extinguisher will be found elsewhere in SAFETY ENGINEERING.

The manufacturers will be pleased to send a catalog explaining features of the Fyr Fyter extinguishers to any one interested.

LOCKHART-HODGE GUARDS

The Lockhart-Hodge line of guards includes the following: Band Saw, Buzz-Planer, Ceiling (attachment for Saw Guards), Double Cut-off Saw Guards, Hoods (Saw covers), open fronts, Hoods (Saw covers), closed fronts, Jointer, Lathe, Railway Cut-off Saw Guards, Shaper, Special Guards. Table attachments for Saw Guards, Table attachments for Shaper Guards, Wood Shaper Guards, Jones Guard.

In considering the subject of guards it is wise not to depend upon amateur attempts at safeguarding. There are usually many wrong ways but only one right way to design and install a safeguard. Theories are dangerous in safeguarding. Successful practice is far more in line with Safety First.

Lockhart-Hodge Company specializes in manufacturing safeguards and is an expert by experience. It has made some notable installations of its guards with satisfactory results both to the employer and employe. Those needing safeguards for the above mentioned requirements can receive full particulars by writing to the above mentioned manufacturer.

FIRST AID EQUIPMENT

In order to meet the demand for Industrial First Aid Equipment the Kny-Scheerer Company, 404 West Twenty-seventh street, New York, has installed a department which specializes in supplying the wants of manufacturers in First Aid Equipment. The importance of having at hand the necessary apparatus, instruments, medicines, etc., to give an injured person immediate treatment has often proved the means of saving a life or preventing an injury from becoming serious or permanent. A First Aid room equipped with the necessary apparatus, ect., is a first class investment for every industrial plant. No matter how thoroughly caution and carefulness is impressed upon industrial workers, in spite of this, accidents will happen. At any moment a life or a limb of an employe is liable to be jeopardized through a sudden accident. It is then that the necessary first aid equipment is needed, and it should be there so the victim may have immediate treatment. Delay in treating the injury is just as serious as delay in fighting a fire. No excuse can justify the negligence of an employer in not providing for the prompt treatment of an injured employe.

Kny-Scheerer Company will be pleased to send a catalog and all information concerning their products to those interested.

SHUR-LOC ELEVATOR SAFETY DEVICE

SAFETY ENGINEERING has constantly called attention to the number of fatal and serious accidents which are caused through lack of efficient safety devices on elevators. The large proportion of all elevator accidents are caused because no attention has been paid to equipping elevators with the necessary safety devices.

The Shur-Loc Elevator Safety Device is a mechanical, automatic, interlocking unit system that needs no extra features. It locks the controller mechanically and holds it positively while the gate is open or unlocked and it releases it only when the gate is shut and safely locked. It has no intricate parts to get out of order. Each Shur-Loc being a unit working co-operatively with the equipped car, absolutely independent of any other unit.

The Shur-Loc elevator device has been installed in many notable buildings and has proved its efficiency as a reliable accident preventor on elevators.

FIREPROOF COMPOSITION FLOORING

The Troegerlith Tile Company, 103 Park avenue, New York City, the manufacturers of Troegerlith Composition Flooring, has furnished us with the following interesting information regarding their product.

Troegerlith Composition Flooring consists of chemicals and fillers of high quality. It contains neither Portland cement, sand, lime, nor mortar; but one of its chief ingredients is asbestos—a mineral which adds greatly to the strength, warmth, resiliency and fire resistency of the floors. It is laid in plastic state, one-half inch in thickness and in a single layer. It bonds directly to either wood, cement or concrete. The material is finished by troweling; takes its initial set in a few hours and may be walked upon after twenty-four or thirty-six hours.

In appearance, cleanliness, lightness and resiliency, Troegerlith Composition ranks among the best flooring materials. It may

Digitized by Google

be installed in almost any color—red, buff and grey being the most popular. These floors may be installed with a border or with a sanitary cove base, and may also be scored to represent tiles.

Troegerlith Composition weighs less than four pounds to the square foot when laid half an inch in thickness. It is quiet, easy on the tread, non-slippery and reasonable in price. Good linoleum or wooden floors cost almost as much as Troegerlith Composition; yet are not as durable, attractive or fire-resistant.

Troegerlith Cork Composition contains a large amount of granulated cork. It, too, is laid in a plastic state, half an inch in thickness and in a single layer, but is finished by means of machinery in a manner similar to terrazzo floors. This rubbing process exposes the small grains of cork, with the result that these floors are exceedingly attractive in appearance. They also rank very high in the qualities of lightness, quietness, non-slipperiness, resiliency and durability.

Troegerlith Composition has been tested and approved, as a fireproof material, by the New York Bureau of Buildings and by the New York Fire Insurance Exchange. It will meet the requirements of modern building and insurance codes, on the subject of fireproofness. Where this material is used as a floor covering, and the foundation beneath it is fireproof, there is usually a five per cent reduction at a lower point in the schedule.

A seven-day test, made by the Stevens Institute of Technology, Hoboken, N. J., shows that the average tensile strength of Troegerlith Composition half an inch thick is 579 pounds to the square inch.

Tests conducted at the Pratt Institute, Brooklyn, N. Y., show that it has a crushing strength of approximately 10,000 pounds to the square inch, when laid half an inch thick.

All floors installed by the Troegerlith Tile Company will be guaranteed for a period of three years, against cracking or deteriorating in any manner, provided the foundations beneath them are approved before the composition is laid and the floor is properly kept by the owner after its installation.

WIRE GLASS FOR INDUSTRIAL PLANTS

The Western Glass Company, Streator, Ill., manufacturer of high quality wire glass states that it can supply wire glass for all industrial requirements. This concern has been manufacturing wire glass for many years and its products are well known as reliable and satisfactory.

OILY WASTE CANS

L. O. Koven & Brother, Jersey City, N. J., are prepared to meet the demands of manufacturers for oily waste cans which are a necessity in industrial plants. Employers should provide waste cans and insist that their employes deposit waste in them. Oily waste scattered around a factory is a dangerous fire hazard.

Koven cans bear the approval of the Underwriters' Laboratories and are also endorsed by the Associated Factory Mutual Fire Insurance Companies. Further particulars can be obtained from the manufacturer.

ENGINE SAFETY

In safeguarding industrial workers against injury an important feature which should never be overlooked is to provide a safety stop for the engine. This removes the grave hazard of fly wheel explosions. Fly wheel explosions are invariably very serious and have been known not only to wreck a building, but also to kill many people. The Consolidated Engine Stop Company, 351 West 28th Street, New York City, has specialized for some years in engine safety stops and offers the advice of its engineers to those seeking maximum engine safety.

GUARDS FOR PRESSES

The Corbin Cabinet Lock Company of New Britain, Conn., known throughout the country for hardware and locks, also manufactures the "Corbin" safety guards for presses and drops.

The Corbin Company is a large user of presses, and this guard was designed primarily for its own use, but it attracted the attention of safety engineers who desired to use the guard elsewhere so the Corbin Cabinet Lock Company decided to place it on the market.

The guard consists of a free-swinging rod of light material, so attached to the machine that the trip cannot be operated while the hands are in danger of injury. It touches the arms above the elbows with a pressure that is hardly felt, and does not in any way interfere with the use of the hands or arms, or require a single special motion. Workmen do not object to its use.

It is attached to a bracket on the machine, and can be instantly removed or replaced at will. It can be used upon any machine without interfering with the action of the trip or obstructing free access to the dies or other parts.

The Corbin Company reports that although it has made no systematic effort to secure orders on these guards, hundreds of them are already in use and the demand is steadily growing.

The Corbin Company invites anyone interested in safeguarding presses and drops to write for particulars and it will be pleased to explain with drawings and blueprints how the guard can be applied to different machines.

BARRETT SPECIFICATION ROOFS

The Barrett Company, who introduced the Barrett Specification standardized roofing practice, announces the issue of a 20-year guarantee.

Digitized by Google

UNDERWRITERS' LABORATORIES'

Recent Approvals and Reapprovals

The Underwriters' Laboratories, Inc., Chicago, under the direction of the National Board of Fire Underwriters and in co-operation with the Workmen's Compensation Service Bureau, maintains laboratories for the examination and testing of appliances and devices, and enters into contracts with the owners and manufacturers of such appliances and devices, respecting the recommendation thereof to insurance organizations.

The object is to give to the user the best obtainable opinion on the merits of appliances, devices, machines and materials in respect to life and fire hazards and accident prevention.

AUTOMATIC SPRINKLER, EVANS, ISSUE B. Globe Automatic Sprinkler Co., 2027 Washington Ave., Philadelphia, Pa.

THERMOSTAT VALVE CONTROL. Gold Car Heating & Lighting Co., 17 Battery Place, New York, N. Y. Temperature regulating system for steam or hot water radiators. Consisting of solenoid operated radiator valves, each requiring 10 W. at 125 or 250 V.D.C., and controlled in groups of from one to four magnet valves in multiple by special thermostatic wall switch.

DISCHARGE DEVICE, INSIDE HAND-OPERATED. Tokheim Mfg. Co., Cedar Rapids, Iowa. Vertical, single or double-acting pumps, designed for use with Inside Discharge Systems for handling hazardous liquids. Cylinder capacities: Less than 1 gal., Cut Nos. 20, 21, 25, 26, 27, 29; 1 gal., Cut Nos. 4, 9, 12. Double acting 1 gal., Cut No. 7.

FIRE WALL DOOR. SLIDING OR SWINGING, TIN-CLAD. Hunt & Schutz Co., Sioux City, Iowa.

FIRE WALL DOOR. SLIDING OR SWINGING, TIN-CLAD. Lozowick & Kotler, Newark, N. J.

FIRE WALL DOOR. SLIDING OR SWINGING, SHEET METAL. American Sheet Metal Works, New Orleans, La.

HOLLOW METAL FIRE WINDOW FRAMES. McFarland-Hyde Co., Chicago, Ill.

MOTION PICTURE FILMS, SLOWBURNING. Atlas Educational Film Co., Chicago, Ill.

MOTION PICTURE FILMS, SLOWBURNING. Pathescope Co. of America, New York.

OPEN SPRINKLERS. EVANS ISSUE "A" ¼-, 5/16- AND ⅜-IN. Globe Automatic Sprinkler Co., Philadelphia, Pa.

PAINT, FIRE RETARDANT, DRY POWDER TYPE. Neptune Paint Co., Hudson, Mich.

PANELBOARDS. Krantz Mfg. Co., Brooklyn, N. Y.

ROOF COVERINGS. ASFALTSLATE SHINGLE. Philip Carey Mfg. Co., Cincinnati, Ohio.

SAFETY CAN. Dover Stamping & Mfg. Co., Cambridge, Mass.

SPRINKLER GUARD. Globe Automatic Sprinkler Co., Philadelphia, Pa.

SPRINKLER WRENCH. Globe Automatic Sprinkler Co., Philadelphia, Pa.

SCAFFOLDING MACHINE. Eclipse Scaffolding Co., Omaha, Neb. Two cable-gripping clutch boxes mounted one above other and connected by suitable linkage.

SOLID SECTION METAL FIRE WINDOW FRAMES. Trussed Concrete Steel Co., Youngstown, Ohio. Solid section metal fire window frames and sash for wired glass.

SWINGING, METAL-CLAD, VERTICAL COMMUNICATION DOOR. Brooklyn Fireproof Sash & Door Co., Brooklyn, N. Y. Wood-filled, metal covered door with depressed insulated panels.

SWINGING, HOLLOW METAL, VERTICAL COMMUNICATION DOOR. Rysdon Co., Chicago, Ill. Door made of sheet steel.

WOODEN EXTENSION TRESTLE. Cheseboro, Whitman Co., Inc., New York. Extension trestle consisting of three straight wooden ladder and hardware hinging two ladders into "A" frame and supporting third in vertical and adjustable position.

GRINNELL DRY PIPE VALVE, MODEL C. General Fire Extinguishing Co., The, manufacturers, Providence, R. I. Differential type for controlling dry pipe automatic sprinkler equipment.

"IMPROVED FURBER DISPENSING CAN." United Shoe Machinery Co., manufacturers. Three-pint capacity cast-iron receptacle for naphtha or similar liquids, used in shoe factories.

INSIDE, HAND-OPERATED, DISCHARGE DEVICES. Chicago Pump Work, Chicago, Ill. Vertical, single acting, single cylinder, pump, designed for use with inside discharge systems for handling hazardous liquids. Cylinder capacity, less than 1 gal.

OUTSIDE, HAND-OPERATED, DISCHARGE DEVICE. Nu-Wa Pump Co., manufacturers, Indianapolis, Ind. Vertical single-acting pump, designed for use with Isolated Storage System for handling hazardous liquids. Cylinder capacity, less than 1 gal. Cut No. C-300m with electric light attachment.

RELC STATIONARY CHEMICAL EXTINGUISHER, 100 GALS. Automatic Sprinkler Co. of America, New York, N. Y. Stationary chemical fire extinguisher, for connection to a standpipe system provided with hose stations; cylindrical tank made of Allegheny iron; liquid capacity, 100 gals.; chemicals used, bicarbonate of soda and sulphuric acid.

SAFETY CAN. Diener Mfg. Co., Geo. W., manufacturers, Chicago, Ill. Sheet metal receptacle provided with automatically closing cover or valve, for storing and handling open stocks of hazardous liquids.

SAFETY CAN. Dover Stamping & Mfg. Co., manufacturers, Cambridge, Mass. Sheet metal receptacle provided with automatically closing cover or valve, for storing and handling open stocks of hazardous liquids.

SAFETY CAN. Gasolene Safety Appliance Co., manufacturers, San Francisco, Cal. Sheet metal receptacle provided with automatically closing cover or valve, for storing and handling open stocks of hazardous liquids.

SAFETY CAN. Imperial Safety Can Co., manufacturers, Milwaukee, Wis. Sheet metal receptacle provided with automatically closing cover or valve, for storing and handling open stocks of hazardous liquids.

SAFETY CAN. Justrite Mfg. Co., manufacturers, Chicago, Ill. Sheet metal receptacle provided with automatically closing cover or valve, for storing and handling open stocks of hazardous liquids.

SAFETY CAN. McNutt Can Sales Co., Inc., submittor, New York, N. Y. Sheet metal receptacle provided with automatically closing cover or valve, for storing and handling open stocks of hazardous liquids.

SAFETY CAN. Non-Explosive Can Co., manufacturers, Chicago, Ill. Sheet metal receptacle provided with automatically closing cover or valve, for storing and handling open stocks of hazardous liquids.

SLIDING OR SWINGING, TIN-CLAD, FIRE WALL DOOR. British Columbia Ceiling & Roofing Co., manufacturers, Vancouver, B. C. Three-ply, tin-clad door, designed for protection of openings in fire walls.

SWINGING METAL-CLAD VERTICAL COMMUNICATION DOOR. Herrmann & Grace Co., manufacturers, Brooklyn, N. Y. Wood-filled, metal-covered door with depressed insulating panels.

SWINGING METAL-CLAD VERTICAL COMMUNICATION DOOR. Moeschl-Edwards Corrugating Co., manufacturers, Covington, Ky. Wood-filled, metal-covered floor with depressed insulated panels.

UNDERGROUND STORAGE TANKS. Wilkes Mfg. Co., S., manufacturers, Chicago, Ill. Cylindrical steel tanks with riveted and caulked joints.

Digitized by Google

SAFETY ENGINEERING

Vol. 32 NOVEMBER, 1916 No. 5

Copyright, 1916, by The Safety Press, Inc. All Rights Reserved

L. R. PALMER

Chief Inspector, Department of Labor & Industry, Pennsylvania

PRESIDENT NATIONAL SAFETY COUNCIL

Digitized by Google

Relation of the Eight-Hour Day to Safety

By Clarence E. Jackson

Consolidated Water Power & Paper Company, Grand Rapids, Wis.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

MODERN industry has realized more and more in recent years the major importance of the human element. Just how long each day the average man should be expected to work has been a subject of general discussion. In recent years the general trend of opinion has been in favor of the eight-hour day, and in many cases even the courts have ruled that 8 hours is a sufficient length of time to work and still allow the workman a reasonable amount of rest, recreation, home life and freedom from the dangers which result from strain and fatigue.

In the spring and early summer of this year nearly every Wisconsin paper mill abandoned the old 11- and 13-hour system and substituted three 8-hour shifts. One important result which might be expected to follow such a system would be a reduction in the number of accidents occurring in these mills, but any attempt to obtain reliable data on the subject is practically futile. Any radical change naturally requires long months of trial, and error and unlooked-for difficulties are sure to present themselves before the new regime is thoroughly established.

REDUCED COST OF ACCIDENTS

In addition to this difficulty of adjustment, we find that on account of recent business prosperity and unsettled labor conditions the number of industrial accidents in the State of Wisconsin has increased approximately 65 per cent since last year. Only one mill reports a decrease in the number of accidents since the 8-hour system began, and those in charge of safety work at that plant have expressed themselves as being quite surprised at the result. It is interesting to note, however, that in spite of the large increase in the number of accidents the total compensation involved has increased only about 7 per cent, reducing the cost per accident approximately 42 per cent, and showing that accidents, although greater in number, are on the whole less severe than last year.

After an important move of this kind an industry will naturally feel that it is on the right track, and will continue along other lines of betterment, each accomplishment serving as a stimulus for future progress. Hence, in the years to come after the 8-hour plan has become firmly established, if we are able to see, as we very likely shall, a marked improvement along safety lines, we will not be able to tell with any degree of accuracy just what proportion of these results is due to shorter hours. Even now when an accident takes place and we find that the injured employe has been working overtime, although we can sometimes assume or guess that long hours was the cause of the trouble, we cannot say definitely that this same individual would not have been injured during the first hours of the day had the conditions been just right.

Our combined mills were pioneers in the 8-hour movement in Wisconsin, having adopted the 3-tour system four years ago. At the same time our injury records, as directed by the workmen's compensation act, became more complete; safety organization was begun, and mechanical devices for the protection of workmen from dangerous machinery were installed. The absence of reliable figures prior to the year 1912 renders it impossible to show any definite comparisons between conditions now and as they existed under long hours, yet we are convinced in a general way that there are fewer accidents, that there is greater personal

Digitized by Google

care, and that our machinery is safer than under the old plan.

TOXIN OF FATIGUE

In comparing safety conditions under the long-hour system and under the 3-tour system, the first thing that presents itself is the matter of fatigue, a topic which has undergone much scientific investigation. Only recently has fatigue been discovered to be a chemical process by which excessive muscular activity impairs the health of the nerve cells, uses up the muscular tissue, and creates more waste than can be absorbed by the system. This poison, "the toxin of fatigue," acts upon the central nervous system and upon the brain, making the nerve cells less responsive to outside stimuli and rendering the muscles incapable of quick response.

FATIGUE RESPONSIBLE FOR ACCIDENTS

In 1907 Senator La Follette became so convinced that the overtaxed body was in many instances responsible for railroad accidents that he brought the subject to the attention of the senate, and investigations showed that a large number of collisions took place after an engineer, fireman, or brakeman had been on duty for more than 15 hours and in some cases as high as 40 hours.

Statistics furnished by the United States Bureau of Labor show that of the 25,000 or more industrial accidents which occur every year the highest percentage of accidents take place between the fourth and fifth hours on duty.

At first glance these figures would hardly seem applicable to the paper industry; however, it might be interesting to know that the writer, in reviewing the accidents which occurred in one of the combined mills since Sept. 1, 1915, discovered that the largest percentage of accidents occurred between the third and fourth hours, with a slight falling off up to the seventh hour and a noticeable increase thereafter, which might possibly shed some light on the probability of an excessive number of accidents during the last two or three hours of a long-hour shift. Opinions from various other paper mills are to the effect that since adopting the 8-hour system there is less fatigue apparent among the workmen.

HIGHER CLASS OF LABORERS

One probable effect of the 8-hour plan would be the employment of a higher class of laborers, who could be counted upon to exercise greater care and precaution on account of their superior intelligence. Better conditions of work and better wages naturally draw better men. Although an insufficient time has elapsed to enable one to judge, it is the consensus of opinion that in time shorter hours will mean the employment of a higher class of careful, intelligent, English-speaking men. The natural outcome would, of course, be a decided decrease in the number of accidents, especially those accidents which result from ignorance and carelessness.

USE OF ALCOHOLIC LIQUORS

One of the most dangerous influences at work against the efficiency and safety of workmen is the use of alcoholic liquors. As in the case of fatigue, alcohol, even when used moderately, distorts the nerve cells, and weakens them to such an extent that the very muscles which are most vital in the performance of one's daily duties are gradually rendered incapable of ready response; and the individual, bereft of self-control, is placed in a position of constant danger to himself and to others. In paper mills there are so many positions which demand self-control and discrimination, that it has been found not only expedient but imperative that the entire industry be protected as completely as possible against the influence of intoxication.

In our own plant we have aimed, so far as possible, to operate on the theory that "an ounce of prevention is worth a pound of cure," and, as far as we are able to determine, intoxication has been practically eliminated by the policy of employing men who stand for sobriety. Other paper mills testify that they have worked along the same lines with equally desirable results.

The 8-hour day has been in vogue so short a time among paper mills that there has been very little opportunity to judge

Digitized by Google

or predict just what the effects will be. In general, however, we will find that ultimately the shorter day will tend to promote sobriety by encouraging better home life, by securing a better and more intelligent class of men, and by the promotion of wholesome recreation and rest to replace the glass of beer or whisky formerly taken to rejuvenate the overworked and fatigued body.

How Should Members of Safety Committees Be Selected?

By E. R. Scoville

Chief of Safety First Bureau, Baltimore & Ohio Railroad Company.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

THE problem confronting those engaged in conducting a safety campaign is to so indelibly impress upon the minds of the greatest number of workmen in the shortest possible time consistent with the plan of education followed, the necessity of observing the first natural law which is that of self-preservation, that they will involuntarily act with *care* rather than be habitually *careless*.

The methods employed by some men in performing work which could be done with absolute safety cause an observer to wonder whether the man ever heard of either the first natural law or of the safety movement.

CARELESS MEN PASSING

The safety campaign is, however, gradually thinning the ranks of the careless workmen. My company is now completing the sixth year of its campaign and various methods have been used in an effort to effect results desired, and, I may say, with success.

The first plan adopted was the formation of general and divisional committees. The divisional committees were composed of the superintendent as chairman and his staff as permanent members. Workmen for each occupation of the several departments were appointed as rotating members, the latter serving for a period of one year.

The second plan adopted was to relieve the members of the general committee of all other duties, to devote their entire time to safety work.

DIVISIONAL MEETINGS

A schedule of dates for holding the divisional meetings was so arranged that the general committee traveling in a body could attend each of the meetings once each month. This arrangement, without doubt, had this desired effect, and continued thus in existence for two years. However, it was observed that during the later part of their term the rotating members had very little to report, chiefly because the stimulus of a new idea had worn off, and, frankly speaking, the long term of service had made them apathetic. It was thought, as a diversion and to reach a greater number of employes, the general committee would to advantage discontinue attending the division meetings for one month and travel in a body to attend pre-arranged general employes' meetings over the entire system—at terminals such meetings were held during the working hours when all work was stopped for about 15 minutes during which the safety propaganda was explained to the men amidst their working surroundings. In this way approximately 26,000 employes were addressed.

It was at this time that the company joined the National Safety Council, and has, since that time, been posting over its system the illustrated bulletins issued by the council, in which the employes seem greatly interested. Later

Digitized by Google

we purchased a copy of the motion picture film entitled "The House that Jack Built." We feel that this picture has done more to stimulate interest among our employes than any one thing in the line of safety campaigning. At practically every point we have been requested to return and show it to those who were so unfortunate as to miss seeing it on the first occasion of its display. This request, of course, will later be complied with.

We have just printed, for distribution among our 65,000 employes, a book of rules on "Safety and Sanitation" applicable to the operating, maintenance of equipment and maintenance of way departments.

SHORT TERM ON SAFETY COMMITTEE

About two years ago it was decided to shorten the term of the rotating members serving on the divisional safety committees, and it was determined that the term should be limited to a period of three months. The result of this change was even better than we had anticipated.

When an appointee is notified of his appointment (usually two weeks prior to the date of holding the meeting) he is given full typewritten instructions as to his duties as a safety committeeman. Thus he is not excused for the first month's lack of co-operation and scant report by the usual statement "that as this was his first meeting he did not know what was expected of him and that he would come to the next meeting prepared."

We did make one mistake, however, in the manner of selecting the committeemen, namely, by arranging for the retiring committeeman to nominate a successor from the same occupation as he himself was engaged in. After nine months' trial we abandoned this method and placed the selection of rotating members in the hands of the division chairman, who now selects men from the various occupations, namely: Conductors, engineers, brakemen, firemen, yardmen, shop, and trackmen. In this way we get committeemen with sufficient intelligence to perform the duties assigned them, capable of observing violation of the rules, and men who will at least attempt to correct violation of the rules even though disinclined to report such acts at the meeting.

It is our custom at each meeting to read the reports of fatalities, if any, and injuries to employes occurring on the divisions during the previous 30 days, and to comment upon serious accidents occurring on other divisions.

SAFETY BUTTONS

All safety committeemen are presented with a beautiful safety button with the company's insignia on its face. All members are paid for the time they lose from their regular duties while attending the meetings and on the day of the meeting they are not required to perform other service.

SUMMARY

Experience with these several methods has convinced the writer that the selection of committeemen should be made by the chairman who is the ranking division officer.

1. To insure at all times having men competent of performing the duty of safety committeemen.

2. That the men who have not previously given the work serious consideration can be brought into the meetings and educated.

3. It is the most convincing method of approaching and gaining the interest and co-operation of the malcontent and antagonist. Special efforts have been made to appoint as many such men on each committee as possible for obvious reasons.

I believe that the term of membership should be for a period of three months for the following reasons:

1. That as the safety campaign is now one of educating employes not only as to the benefits to be derived, but in safe performance by limiting the term to three months a greater number of men are given the opportunity for such education.

2. That within three months a member has had an opportunity to report approximately every factor of safety liable to come under his observation.

Digitized by Google

3. That he is inclined to be more enthusiastic at the time of his retirement than when in service for a longer term which has a tendency to produce an apathetic spirit.

4. A greater number of employes rub elbows with the superior officers on the division than would otherwise be the case. Confidence grows, friendships develop, loyalty and co-operation follow, and the larger the number of committeemen, the greater becomes the number of converts among employes.

When the employes come to realize their duty to their families, to themselves, to the industry that employs them, and to the community from the standpoints of safety, and what it means in the conservation and preservation of life and limb, and that safety is a factor in industrial and transportation operation which requires serious thought and even great study for successful accomplishment, then, and then only, may we confidently hope to rest on our oars.

How to Make Safety Committee Meetings Interesting

By W. C. Wilson

Claims Attorney, D. L. & W. Railway Company, New York City.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

THERE are all sorts of division safety committee meetings—some of them are funerals, some are merely debating societies, some are very efficient. If they are funerals, they bury the "Safety First" movement under the sod; if they are debating societies, they bury it under an avalanche of words; if they are efficient, they put the red blood of success into every artery of safety work.

It goes without argument that preparedness is necessary for the success of a meeting. There are at least two requisites for a safety meeting—items and ideas—and an aggregation of men who have neither won't get anywhere. But these things do not grow spontaneously, they can only be cultivated by previous thought and preparation. Each member of the committee should be made to feel that it is up to him to come to the meeting prepared to contribute to its success by submitting to it something of practical value and that this duty cannot be delegated by him to somebody else.

WHEN THE MEETING IS A FROST

But now we will assume that the meeting is on and is proceeding to business. Perhaps the membership is arranged something like this: On one side the division officers, on the other side the representatives from various branches of the service; between them a chasm, and at the head of the chasm the superintendent, or other presiding officer, sitting on a judgment seat and enshrined in an appearance of dignity and gloom. All hands feel about as comfortable as a man in the dentist's chair. The chairman pulls himself together and remarks in a more or less bored tone: "Gentlemen, the meeting is called to order. I hope it won't last long because I have a very important engagement and want to get away as soon as possible." Then he pulls his watch and shifts his leg. Great enthusiasm for safety ensues, and every member looks as though he was willing to do or die for the cause—especially die.

The chairman then turns toward Switchman Bill Jones, who happens to be at the head of the line, and jerks out: "Well, Mr. Jones, have you got any criticisms to pass on how this road is being run?" Bill rather sheepishly pulls out a little niemorandum book and after fingering the leaves a moment reads off a few items—there was a hole alongside of No. 10 switch in the east yard; a lot of debris was scattered all along the lead; the shoulder of the fill on track 14 should be filled out as it was dangerous at night

Digitized by Google

in jumping on and off cars. He suggested that the road department get busy. At which the roadmaster blows up with: "Say, you fellows want that east yard laid with Brussels carpet from one end to the other, with a Morris chair at each switch."

Without going further into the proceedings of a meeting of this sort—which I am sure is not typical of most of them—it is evident that the atmosphere which surrounds a meeting has much to do with its success. Officialism must be put into the background and co-operation must stand out as predominant. But this cannot be secured by permitting the discussion of a wide range of subjects having only incidental relation to safety. The superintendent, who is usually the chairman, is the key to the situation. If he can impress the men with his sincerity of purpose, that he is heart and soul with them in the fight against avoidable accidents; that, in fact, he is the best "Safety First" man on the committee; if he will greet the members cordially, make them feel at home, exercise a friendly tact in drawing out the best that is in them, and thus create an environment of good fellowship and co-operation in the humane work that is set before them, he will have done more than any other one man could do to solve the problem of interesting and profitable meetings. If, on the other hand, he is cold and indifferent, narrow in his views, official in his bearing and unresponsive, if not tacitly antagonistic, to the suggestions offered, he can kill the meeting as dead as a door nail and with it the vital spark of the whole safety movement.

FELLOWSHIP AND SAFETY

If you will permit me to digress for a moment let me say that the social features of the committee problem present an interesting question. Without discussing the matter I suggest the advisability of tendering a dinner to the members and their wives at least once during the lifetime of each committee. An occasional dinner or luncheon served in connection with the committee meeting is advocated by some as a very welcome gastronomic diversion.

Committee meetings will not run themselves. Aside from what might be called routine work, special features should be introduced to keep the interest alive. Mere routine, though necessary, of course, tends to narrow the mental horizon and dim the intellectual vision. Men need the impetus of a new fresh idea—the stimulus of a new setting to an old idea—the inspiration which grows out of contact with men from other fields, who bring messages of good cheer and counsel in the great cause of safety.

Suggestions as to special features have been many. A few of them are: That topics be assigned to members of the committee on which written papers are to be read at future meetings for further discussion; that general officers and members of the central safety committee occasionally attend division meetings to encourage and advise with the members; that people prominent in public or industrial fields be invited to address the committee, and other employes, especially former members, who can arrange to attend.

FREEDOM OF DISCUSSION

Now as to the work of the committee itself, there must not only be freedom of discussion but evidence of integrity of purpose. There can be no successful safety meetings if a policy of repression or avoidance is in evidence as to matters which are proper subjects of discussion. Free exchange of opinion must be encouraged or the result is very likely to be a Quaker meeting and a barren result. The accidents of the previous month should be stated and analyzed. This is always a live topic, because it presents concrete examples of the way accidents are caused and how they might have been avoided. It also will always bring out the ever-present baffling problem of the personal equation as applied to avoidable accidents. As a rule the men do not like to discuss the unsafe practices of their fellow employes, especially in the presence of their officers. To avoid this it has been suggested either that the division committee be composed only of employes, as distinguished from officers; that the committee so organized hold its own meetings, reporting to the officers its recommendations, or that sub-com-

Digitized by Google

mittees of employes be appointed to take up the question of dangerous practices to handle in their own way.

The life-blood of the whole "Safety First" organization flows out from these committee meetings. Their interest must be maintained if there is to be efficiency all along the line. Its members, both officers and privates, must be made to feel the weight of responsibility which is theirs. If they shirk that responsibility or fail to measure up to the demands of their high calling, if they are unwilling to be prophets of the new faith and to stand for a time as sentinels to point the way to safety, then they should make way for others who have a clearer vision, warmer hearts, and stronger and more willing hands for the work which is set before them.

The Functions of a Modern Employment Department

By A. H. Young

Supervisor of Labor & Safety, Illinois Steel Company, South Chicago, Ill.

Proceedings of Fifth Annual Safety Congress, National Safety Council

THE employment bureau of today has responsibilities far outweighing the mere supplying of labor and maintenance of service records. Not only must job and man harmonize, but also must it be assured there will be no discord when *many* men are fitted to a single task. Turk, Serb, Greek, Croat, Dalmatian, Montenegrin, Russian, or Pole may each be found desirable as laborers in a blast furnace plant; but a wise employment agent will not try to blend them all into one "gang" lest the accident rate rise. ("You can't keep red ants in a black ant hill.")

This recital of only a few of the activities of the employment office may serve to indicate that the old order of hiring and firing is a thing of the past. A few years ago it took only the beckoning crook of a boss' finger to the waiting applicant at the gate and his name forthwith appeared on the payroll. Likewise, the operation of "firing" or "canning" was fully as simple and despotic.

SUPERINTENDENT MUST BE MAN OF ABILITY

First of all, the superintendent must be a keen student of human nature, quick to judge the faker, and patient in uncovering ambition from beneath the immigrant's cloak of ignorance and awkwardness. He must not only be aware of the location of all the groups of foreign settlements in the community, but he must become personally acquainted with the individual boarding bosses, steamship agents, clergymen, and other influential agents with whom the immigrant maintains a close contact.

No less exacting is the duty of keeping closely in touch with all the foremen in the plant which he serves. A proper distribution of new employes requires the agent to know the varying character of the duties of each job in each department, and the more marked idiosyncrasies of foremen and superintendents.

In the most progressive of our modern business organizations the manager of the employment department is given extensive and final authority. In hiring laborers and men for occupations of relatively minor importance he passes final judgment on the applicant's fitness and hires or rejects him directly. In other cases he retains jurisdiction as to eligibility in all details, except as to skill, and passes the applicant on to the foreman or superintendent for judgment as to this latter trait.

Physical examination of employes is properly another item of employment detail. Usually the complete report of the physical examination is kept in the surgeon's files, and only a grade symbol used in the employment office. A small card

Digitized by Google

is prepared, giving date of physical test, surgeons' file number, and a symbol—A, B, C, or D.

"A" indicates the applicant passed all tests satisfactorily and is fit for any class of employment. "B" indicates same as "A," except that some permanent disability is possessed, such as a scar, a missing toe, or stiff joint. "C" indicates the applicant has disabilities which may prohibit his employment at certain occupations. Whenever this classification is assigned the employment manager is required to obtain the approval of the surgical department for the particular job involved, and cannot subsequently transfer the employe to another department or change his occupation without such approval. "D" signifies complete disqualification in the case of a new applicant and a very special consideration of all relative facts when assigned to a present employe.

ROUTINE OF EMPLOYMENT OFFICE

The first routine of the employment office, following the acceptance of the applicant after physical examination, is the preparation of the "service record" card. On one face is entered the employe's full name and address and personal signature (very useful for identification and protection in the matter of written orders for disposition of pay check, etc.). Provision is also made for the name and address of the person whom the employe desires notified in case of sickness or accident. The balance of that side of the card is ruled off for entering the date and cause of beginning and ending service in each occupation.

On the reverse of the card is entered: Country of birth and race of the employe and same of parents; number of years in this country (if foreign-born); whether or not naturalized; whether married or single; number of children and whether or not family is in this country; age; ability to talk, read and write English, and read or write native language.

The complete record card can be prepared in less than two minutes by our experienced interpreter, who then makes out an employment slip which is given to the man. This shows his name, register number, occupation, and the name of the foreman to whom he is to report. He is also given a book of rules in his native language and personally conducted by a uniformed patrolman to his new foreman. On the way the patrolman takes him to the clock house and shows him how to ring in and out, then to the locker and wash room. He is also carefully directed over the proper route to follow to and from the gate nearest his department.

Every practicable inducement is offered to retain an employe in the service, and the matter of issuing a pay-off slip, either because of resignation or dismissal, is especially scrutinized. These pay-off slips are made in sheets perforated in three sections, padded in book form and issued to superintendents. On the cover of the book is this notice:

"Above all other qualities in an employe, *'experience'* tends for greater *safety* and *efficiency,* therefore, foremen are especially requested to act with careful consideration in terminating the service of a workman.

"The company strives to secure and maintain a corps of careful, efficient, sober, and steady workmen. It offers fair wages, opportunities for advancement, pensions, and other inducements to employes to continue in its service.

"Don't discharge a man unless you are sure the best interest of the company demands it.

"Don't carelessly mark a red slip 'quit or 'discharged'; it may do the employe not only a great deal of harm, but gross injustice.

"Strive earnestly to build up an organization of careful, steady workers."

HOW THE RECORD IS FILED

The top section is the stub retained by the department head, and records such data as he may wish. The second, or middle section, is required to be sent promptly to the labor department, and gives name, payroll number, and the true cause for leaving the service. The third, or bottom section, is an order on the accounting department to pay off the employe. This he is required to bring in person to the employment office, where record is made on his service card, which

Digitized by Google

is then transferred to the "dead" file. He is courteously asked his reasons for leaving, and an attempt is made to get an expression of his view of employment with the company.

The head of the labor department has authority to review all cases of discharge, and if, after full investigation, he does not feel satisfied the best interests of the company are served by the dismissal of the employe, he reinstates him—usually by transfer to some other department. Likewise, if a man quits because of peculiar conditions in one mill which are not present in another, a transfer is suggested.

The opportunities of the employment manager to efficiently serve his company are many and great. His opportunities to render true service to his fellow men and to be a real factor in the great movement of fellowship which at this time is sweeping over industrial America are limitless.

Relative Importance of Accident Causes in Industries

By E. H. Downey

Proceedings of the Casualty Actuarial and Statistical Society of America.

THE writer has computed, upon the basis of Ohio and Wisconsin experience, the cause-group values for the manufacturing and, separately, for the wood-working industries of those States. It is, of course, recognized that the experience here used is insufficient and, further, that the statistics themselves have not been fully analyzed from the present point of view, so that the values had to be derived, in part, by the method of imputation. Nevertheless, the results for each State agree rather closely with the combined results, so that the whole may be taken as sufficiently accurate for illustrative purposes. The cause groups are those formulated by the Statistical Committee of the International Association of Industrial Accident Boards and Commissions, with certain minor rearrangements. For schedule making these groups could, of course, be subdivided or recombined to such extent as might be deemed expedient. It will at once appear from the subjoined table that barely one-half of the total hazard in these industries is attributable to mechanical causes, even when that category is extended to comprise boilers and other steam-pressure apparatus, electrical installation, and railway equipment. On the other hand, a fair proportion of non-mechanical accidents arise out of remediable conditions of plant and equipment. Thus analysis of the Wisconsin data included in the table indicates that 5 per cent of the weighted time loss from falls of persons in the manufacturing industries of that State are due to falls upon stairways, 25 per cent to falls from balconies, runways, platforms and trestles, 18 per cent to falls into vats, bins and tanks, and 10 per cent to stumbling over obstacles in passageways and falls upon uneven, defective or slippery floors. When all such allowances are made, however, there will still remain a large number of accidents which cannot be definitely related to specific items in a rating schedule, though they may be taken account of in arriving at the value of safety organization and education.

Digitized by Google

RELATIVE IMPORTANCE OF ACCIDENT CAUSES IN INDUSTRIES SUBJECT TO SCHEDULE RATING AS MEASURED BY THE NUMBER AND SEVERITY OF ACCIDENTS ASCRIBED TO EACH CAUSE.*

No.	Causes.	All Manufacturing.†	Wood Working.‡	No.
1.	All causes	100.0	100.0	1
2.	All machinery	47.1	51.	2
3.	Prime movers	1.5	1.0	3
4.	Transmission apparatus.	7.8	9.0	4
5.	Working machinery	24.5	37.5	5
6.	Elevators	6.6	2.5	6
7.	Cranes and conveyors	6.8	1.0	7
8.	Boilers and steam pressure apparatus‖	.8	.5	8
9.	Vehicles, power and animal¶	3.3	1.5	13
10.	Electricity	1.6	1.0	9
11.	Explosives	.6	0.0	10
12.	Conflagrations	.3	0.	11
13.	Hot, corrosive and poisonous materials	6.4	.5	12
14.	Falls of persons	12.1	12.5	14
15.	Stepping on or bumping against objects	2.5	3.5	15
16.	Falling objects	6.6	8.	16
17.	Hand tools	5.4	4.5	17
18.	Objects being handled§§.	12.7	15.0	18
19.	Other causes	.8	2.0	19

*Based upon work accidents in Wisconsin, July 1, 1912, to Dec. 31, 1914, and in Ohio, Jan. 1, 1914, to June 30, 1915. The statistics were taken from the official reports of the industrial commissions of those States, supplemented by some special analyses for which the writer is indebted to Messrs. F. C. Croxton and W. H. Burhop.

The weighting system employed is explained in the *Bulletin* of the Industrial Commission of Wisconsin issued August 1, 1915, and entitled Industrial Accidents.

The percentages given represent total accident weight (number of accidents by severity weight of each).

†Based upon 44,386 compensatable accidents—i. e., accidents which caused death, permanent disability, or temporary disability for more than one week.

‡Based upon 5,092 compensatable accidents as above defined.

‖Includes explosions of and escape of steam and hot water from, but excludes other boiler-room accidents.

¶Includes falls of persons from vehicles while in motion. Probably includes also some accidents improperly charged to manufacturing classifications.

§Excludes objects dropped in carrying, lifting, loading or unloading.

§§Includes hand truck accidents, and all accidents in carrying, lifting, rolling, loading, unloading, or other handling of objects, all without the use of mechanical or animal power.

Structurally, the scheme herein suggested would follow the coal mine rating schedule of the Associated Companies. Substandard features of the given establishment would be graded in deficiency points whose relative weights would be fixed by the cause-group values already explained. The schedule rate of the establishment would then be determined by the formula:

$$R = B\,(1 - U) + U\,B\,\frac{X}{L'}$$

where R is the establishment rate, B the basis rate, U the maximum allowable discount (in per cent of base rate), X the number of deficiency points developed by the establishment in question, and L the normal number of such points for the industry group. The items in respect to which risks would be graded might be much the same as in the existing schedules, save that their values would be expressed in points convertible into percentages of base rate. The device of the normal allowable points of deficiency, or the number of deficiency points equivalent to base rate, is introduced to secure a balance of premium increases and decreases upon schedule rated risks. Normals for each industry group would, of course, be determined statistically, by analysis of actual inspection reports. Such determination, however, would be comparatively a simple matter; it is even probable that existing inspections would afford sufficient data for the purpose.

The practical operation of such a schedule may conveniently be illustrated from the treatment of the machine hazard in wood-working establishments. The tentative table of values already recited indicates that working machines comprise 37.5 per cent of total hazard in this group of industries, or 37.5 charge points in a total of 100. The working machine charges of a particular risk would then bear such ratio to 37.5 points as the number of unguarded machines per 100 employes bears to the normal proportion of working machines in the classification to which the risk

Digitized by Google

belongs. Algebraically the computation may be expressed:

$$N = 37.5 \frac{\frac{WM}{100}}{\frac{LWM}{100}} = 37.5 \frac{WM}{LWM},$$

where N is the number of machine charges (in points), $WM/100$ the actual number of working machines per 100 employes, and $LWM/100$ the normal proportion for the classification. In computing the ratio, $WM/100$, a completely guarded machine should count for only a fraction (say one-half) of the full machine hazard. Similarly, separate allowance might be made for guarding at the point of operation, as distinguished from general guarding. It might even be feasible to assign different weights to different types of machines, so that a square-head jointer, e. g., would count for more than a turning lathe. These, however, are matters of engineering detail. The distinguishing feature of the proposed method of treatment is that all phases of working machine hazard—type of machines, quality of guarding and amount of equipment per unit of exposed payroll—sum up in a single ratio to total hazard of the industry. Sash, door and blind establishments, e. g., grade all the way, in character of operations and of output, from planing mills to furniture factories. Under the proposed plan, mill "A," with the full classification number of working machines (92 per 100 employes) would receive the full charge of 37.5 points if all machines were unguarded (N=92/92 x 37.5), and one-half charge, or 18.75 points, if all machines were completely guarded (N = 46/92 x 37.5). Under the like conditions mill "B," which has only 69 machines per 100 employes, would carry, respectively, 28⅛ and 14 1/16 points [N = 69/92 x 37.5 and N = 69/2/92 x 37.5]. That is to say, the machine charge ratio between the two plants is the same when both are completely guarded as when both are wholly unguarded: the premium rate expresses the quantitative relationship in mechanical hazard. The like result, obviously, cannot be predicated of any existing schedule.

It is believed that the method above sketched for the rating of working machines could be applied as well to transmission apparatus; perhaps also to traveling cranes, elevators, and certain other hazard features. Other hazards, apparently, could only be measured by the unit method; such, for instance, are defective floors, unrailed stairways and unprotected balconies. Some features, lastly, and those not the least consequential, would probably be subsumed under the somewhat vague captions of safety organization and safety measures, whereof no statistical valuation appears to be possible. In short, neither the plan herein outlined, nor any other yet proposed, would altogether do away with judgment values. The hazard of a guarded as compared with an unguarded punch press, of individual motor drive as compared with shaft transmission, or of a variety shaper as compared with a belt sander or a buzz saw, the accident prevention value of toe boards per 100 feet of overhead balcony, or the accident insurance cost of a hole in the floor, can never be mathematically determined. The suggested plan, however, would limit the function of personal judgment, except in the realm of so-called "moral" hazards, to fixing the relative weights of individual items within a group whose total weight is statistically determined.

Digitized by Google

Wood Room Safety

By C. A. Martin

Burgess Sulphite Fibre Company, Berlin, N. H.

Proceedings of Fifth Annual Safety Congress, National Safety Council

"WOOD ROOM SAFETY," presents a problem more complex perhaps than that of any other department of a sulphite mill. In this particular department, brawn is much more common than brain; foreign labor, in our Eastern mills, at least, is greatly in evidence; and the appetite for alcohol is sometimes a source of anxiety. But among this class of men, difficult to instruct regarding the dangers that surround them on account of their diversified nationalities and inherent weaknesses, an occasional spark of wit crops out to show that the seed of "Safety First" has taken root. Soon after a safety campaign was started in the mill with which I am connected, a machine was installed in the form of a planer for removing small patches of bark from our wood; an ideal arrangement for removing fingers as well. The next morning on going my rounds my attention was attracted to a crudely painted sign over this machine, which read "This is Safety Last."

ONE ACCIDENT A DAY

During the past year the total accidents in our mill numbered 349 for an average of 1,175 employes, or a little less than one a day. This, on first thought, may seem like an unnecessarily large number until an analysis is made of the same. Out of this number not a fatal accident has occurred; not a limb has been broken; and the most serious results have come from blood poisoning which originated from very slight wounds. Had many of these cases of blood poisoning been reported and been intelligently cared for at the start, no evil effects would have resulted.

Out of the total of 349 accidents for our mill, 143 have occurred in our maintenance department, which comprises 270 men; 56 in our wood room of 160 men; 56 in our wet machine room with 260 men; 20 in the yards, where our raw materials are unloaded and an average of 60 men is employed; 10 in our boiler house of 54 men, and 65 in miscellaneous departments with 371 men.

SAFETY MEN ON EACH SHIFT

In the wood room, as in all other departments of the plant, there is a safety committeeman on each shift, whose duty it is to look after the safety welfare of his fellow employes in connection with his regular work. Once a week he devotes an hour entirely to the purpose of looking up dangerous places and reporting the same directly to our engineering department for attention.

These safety men are selected by the various department heads from their more intelligent employes and serve for a period of 12 weeks, a new man being appointed every 4 weeks. The oldest member in point of service on the committee then becomes the chairman for his department and a member of the central safety committee of the mill. This central committee meets once a month with the higher officials of the plant to discuss the accidents that have happened since their last meeting and to offer suggestions to prevent their recurrence.

WOOD ROOM MACHINERY DANGEROUS

Wood room machinery is naturally of a dangerous character. At present my company uses nothing but peeled wood and the small patches of bark are removed by axes, with the consequent result of an occasional axe wound; wood hooks and pickaroons cause punctured flesh at intervals, and bruised feet and hands from falling wood have their places on our accident lists.

Up to a few years ago our wood room was equipped with disc barkers, crowded into a space as close as man's ingenuity

Digitized by Google

could devise, with a belt running so near the operator's back that it almost tickled his spine. His hands were tendered and numbed by reaching into a tank filled with water to obtain his wood, and an occasional splinter flying from a neighboring barker attracted his attention. Mangled fingers were a frequent occurrence and at intervals a man was caught in a belt.

If the disc barker is to continue in use, as it doubtless will for a number of years, its operator should be given ample room in which to work in order that he may devote his full attention to what he is doing; he should be carefully instructed before starting on his job; his machine should be well lighted and above all he should be absolutely sober.

MANY ACCIDENTS PREVENTABLE

I feel that I have a very narrow subject to write about, so I am going to specialize a little and deal with the chipper, to which we have given much time and thought. Chipper accidents are caused almost entirely by wood bounding out of the spouts. Much of this bounding is produced by the uneven wear in the face of the disc, which has the effect of a series of cams; the faster the disc revolves the greater the cam effect and the poorer chance the knives have to make the proper cut and hold the wood in place. The heights from which the wood is fed in order to keep it pressed against the disc is an important factor for chipper safety, as is the angle of the spout with the disc to produce the necessary shearing effect; and last, but not least, a bed plate which will form the very necessary support for the wood which is to be chipped.

We have four chippers with discs 9 feet in diameter and carrying knives 27½ inches in length. These discs revolve but 175 revolutions per minute and have removable plates on their faces, which are regularly inspected and measured by our engineering department to determine the amount of wear. When the wear becomes excessive the plates are removed and new ones put in.

The chipper spouts are set at an angle of 45 degrees with the base and 30 degrees with the axis of the shaft. These spouts are made with round bottoms, and the bed plates are semi-circular in shape and are of chilled iron.

We have three varieties of these spouts to receive the various sizes of wood: one with three compartments to take up to 7¼ inches in diameter, two double-barreled spouts for wood between 7¼ and 11½ inches, and one large spout for wood between 11½ and 16 inches. The wood is fed from a height of 8 feet, and each stick rests on the bottom of the spout.

These slow running, heavy chippers, developed primarily for producing a uniform chip, have paved a road of security for the men who feed their hungry mouths.

PULLEYS AND BELTS GUARDED

Most of our exposed pulleys and belts are well protected and all of our belt guards are catalogued and numbered. Weekly inspection was found necessary on account of many guards being taken down when repair work was going on and not put back in their proper places when the jobs were finished. Formerly a number of accidents occurred on account of the striking end of cold chisels becoming cracked and burred under heavy usage and particles of steel chipping off when they were struck. One of the more serious accidents that we have had in our wood room was caused by one of these flying bits hitting the eye of one of our men. When defective cold chisels are found, they are ground on the emery wheel until their heads are smooth and rounded.

In any department of the mill, be it wood room, machine room, digester room, or acid plant, guards may be put in of every conceivable variety, machinery may be installed which is less dangerous, but the employe himself must get the spirit of "Safety First" and help in the work. The bulletins now being circulated by the Safety Council are of great educational value; the very act of putting up safety devices attracts the employe and interests him in a right direction; and the serving of men on safety committees is of immense value.

Digitized by Google

Safety Education in the Public Schools

By R. B. Morley

Secy.-Treas., Ontario Safety League, Toronto, Ont.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

IT is hardly appropriate that any remarks of mine should be read before this conference on so big a subject as "Public Safety Education in the Public Schools." I can, however, hope to convey some impressions of the methods adopted and pursued by the Ontario Safety League in the campaign carried on continuously since January 1, 1914.

Before commencing the actual school work it was desirable to prepare the general public mind through the usual channels, so that a proper appreciation of the campaign would ensue. You will understand that it was necessary to secure the support and co-operation of the Board of Education before anything could be done in the schools. The board was approached in April, 1914, and granted us permission to visit all of the schools to give short talks in the classrooms and afterwards make a distribution of special buttons. As soon as this authority was secured, we ordered 100,000 celluloid buttons. Owing however to a delay, these did not reach Toronto until early in June, and it was then too late to commence the round of the schools due to pending examinations and the approach of the summer vacation. As soon as possible after the opening in September we began our tour.

INTERESTING THE CHILDREN

The principal of each school received a letter advising that the officials of the league would be at the school shortly. The plan followed was simply to select each day, for the following day, a school or schools, according to size. Usually, the principal notified the teachers that we were in the school and requested every attention. We then commenced in No. 1 classroom, and, according to the ages of the pupils, made a short address, showing the need for the prevention of accidents of all kinds and explaining that accidents were mainly the result of carelessness. The talks usually occupied less than five minutes in each class. It was found desirable to speak in the individual rooms in preference to calling the whole school together, as it took a minimum of the school time and made it possible to use language suitable to the age of the children. For instance, there seems little object in talking of "accident prevention" to children of 5 or 6, but if you tell them that you want them to be careful on the streets and to look before they cross a road, and that you are going to give them each a button to remind them to be careful, you have given the necessary caution and left a clear impression that is almost sure to bring fruit. It was, however, found necessary to explain to the tiny tots that the button was not a charm. One day a little girl of 6 pointed me out to a chum with the remark "There's the man that gives you the buttons that keeps you from being ran over." Our buttons were good but scarcely so valuable as that.

In 1914 we issued nearly 150,000 printed blotters through the schools and each year the Board of Education has authorized the printing of safety principles on the exercise and dictation books used by the pupils and distributed gratis to them as required.

We have used each year, with good effect, the motion picture film known as "The Price of Thoughtlessness."

During the years 1914, 1915 and 1916 we have conducted, at the request of the Ontario Motor League, a competition for compositions upon "How Children May Help to Avoid Motor Accidents." Cash prizes totaling $50 were awarded each year by the Motor League.

In June, 1915, we commenced our School Bulletin Series, modeled on the plan of the Brooklyn Bureau of Public Safety, under Mrs. Jessica P. McCall. To my mind, these bulletins are the most

Digitized by Google

important work we have yet carried on. The bulletins are couched in language understandable to all the children and deal with every day conditions. A new bulletin is placed in each classroom every Monday morning. Most of the bulletins are illustrated with timely pictures and always the physical appearance of each succeeding one is changed so that the pupils will readily notice that a fresh one has been placed. We show the children how accidents happen. We tell them of the different kinds of accidents.

So far as street accidents go, we have endeavored to impress the need for looking before crossing any roadway. We have given them lessons governing accident and fire prevention, some of them intended to be carried right into the homes and have tried to build up in their growing minds the idea of preventing accidents to others as well as to themselves.

TAKING SAFETY HOME

In conjunction with the bulletins we issued in June of 1915 and 1916 a "Letter to Parents" along the lines of one put out in 1914 by the Boston Chamber of Commerce. Copies of the letter were distributed in the schools to each pupil and taken home to be read by the parents. A perforated slip at the bottom of the letter stated "My parents have read the accident prevention letter." The children were asked to sign and return these slips to the teachers.

"Sure Pop and the Safety Scouts" has been added to the libraries of over 100 schools and is authorized as a supplementary reader in the junior classes.

SAFETY PATROL

We have completed arrangements for a trial of the safety patrol idea in the Toronto schools and have prepared an illustrated pamphlet showing how to organize patrols, together with safety pledges and safety reports. The plan followed is to select from four to twelve of the older pupils to constitute a school patrol. They either elect their captain or he is named by the principal and we have suggested that the captain should be changed from time to time to allow other members to develop new ideas.

The duties of the patrol are fairly simple. The members make a point of arriving at the school a little in advance of school time so that they may take posts near the school grounds and caution and protect the younger pupils. They are also released a few minutes earlier for the same purpose and to generally take a share in preventing accidents of all kinds. The captain is required to plan the work for his patrol, to make reports of accidents or unsafe conditions, and to act as the leader in accident and fire prevention in his district.

Much good should accrue from safety patrol work as it not only protects, to a great degree, the small children who are prone to rush wildly across the streets, but it also instills into the minds of the older pupils the idea of accident prevention and the thought of caring for their smaller comrades.

CHILDREN ARE MORE CAREFUL

To sum up our distribution of literature and other matter to the schools and school children I give these figures covering work since April, 1914:

100,000 safety buttons.
150,000 safety blotters.
100,000 school bulletins.
170,000 letters to parents.
125 copies of "Sure Pop and the Safety Scouts."
$150 in essay prizes.

As for results, I am unfortunately not able to give any definite statistics. I have, however, been repeatedly assured by motorists and others that the children on our streets are much more careful for the two years of safety education and the chief inspector of the Toronto schools has made most encouraging statements to me.

Digitized by Google

The Human Side of Industry

By Dr. Otto P. Geier

Director, Employes' Service Department, Cincinnati Milling Machine Company.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

IT is quite probable that Socrates might have opened this discussion with the question, What should be a man's full purpose in life—big enough for his full capacity—big enough for all his years? Is it not more important to teach men how to live than how to make a living? It is quite possible that right minded men in industry, having instituted personal service departments, are engaged in a human endeavor which seeks to find answer to some of these questions.

Is there abroad a new and deeper conception of our duty toward our fellow man? Has not the "Safety First" movement, fostered by this association, proved a boon to humanity? Has it not been a great satisfaction to find an economic method of lessening the human waste due to preventable accidents and occupational diseases? Are we ready to make a further contribution to society by seeing to it that the industrial groups are to be made healthier and happier?

Can the spirit of good will and co-operation in large industrial units become so operative that it will leaven the rest of society and actually lead in social reconstruction?

Does not the consideration of the health and well-being of the worker furnish the most tangible basis for such co-operation? What is industry, in co-operation with its employes, going to do about alcoholism after it has counted the cost in lost time, lost production, lost happiness, to say nothing of the misery, want and crime that follow in its wake? Is society willing to continue to pay the price? Intemperance is the cross of the industrial physician. He copes with all other diseases with hope and vigor, but confronted with alcoholism in the worker he sits relatively limp and helpless. A man with a cancerous condition is fortunately short-lived, but the alcoholic seems at least to live indefinitely. Must we, like Russia, wait for a national crisis before we give up our consumption of vodka?

Out of the study of the European war and the consideration of our own military preparedness, has grown the conviction that industrial preparedness must precede any military preparedness and that it is really the foundation stone. Competent industrial leaders are today taking a national inventory of our various industries and their possible productive efficiency in time of war. Are they also taking a measure of our social preparedness for a national crisis?

Intelligent modern industry now recognizes the opportunity for service to its employes. As a result we have today many of the finest examples of co-operation between labor and capital in the activities of "personal service departments." In the past many abortive attempts at so-called welfare work have signally failed because, as a rule, the supposed benefits have been imposed upon the group of workers, requiring and asking no service on their part. The average American workman is suspicious of an employer "bearing gifts." This same average American workman, however, is keen enough to engage co-operatively in any undertaking that is frankly advanced by the employer as of mutual advantage. He merely asks that "all the cards be laid on the table." I know of no better expression of such "a fair deal" between labor and capital than the establishment of an all-comprehensive employes' service department.

Time will not permit any general discussion of the principles involved in the conduct of service departments. Suffice it for me to place before you a bare outline of an employes' service department.

Employment Service.—Meet the applicant for a job with courtesy. You owe him something for the time and money he has spent in coming to you. The employment department is the workman's first impression of your

Digitized by Google

methods of doing business. The cheap, surly employment clerk adds to your annual turn-over.

Locker Room Service.—Having hired the man, give him something in your plant which he can call his own. A locker will encourage personal dress and hygiene. The dirtier his work the more necessity for good washing and bathing facilities, and opportunity for change of clothing. Don't make your workman carry your shop dirt to his home.

MEDICAL SERVICE

Physical Examinations.—Used as a means merely to eliminate the unfit, it will fail lamentably in reaching the 100 per cent. Give the employe the benefit of your physical findings. Begin his education as to the value of health and care of his body at the time of physical examination.

Sanitation.—Raise the hygienic standards of your workmen in their homes by teaching them that cleanliness in the workshop pays. Good toilet facilities encourage good habits. Good drinking fountains are factors of good health and deterrents of alcoholic habits. Good light and ventilation further increase the comfort, contentment and health of the worker.

"Safety First" Work.—No better method of engendering a good spirit in your shop can be found than by showing your employe that you value his fingers, toes and eyes above his productive efficiency. The National Safety Council has made this part of our work relatively easy.

Care of Those Injured.—Prompt, considerate, intelligent, professional attention by the plant physician, in properly equipped treatment rooms, bids fair to replace all "First Aid Jars," "Handy Men" and "Quack Eye Pickers" in many industries. The employment of the right type of a full time physician is economically sound in plants employing 500 or more men.

Dispensary.—Lost time from preventable sickness is greater than the loss of time from accidents. Why not stop this waste by supplying the workman with the advantages of an all-day clinic? The plant physician can forcibly teach the man that it pays to be healthy, steady and of good habits. Your all-day dispensary acts as a medical and surgical clearing house, so that your men may be advised to seek out reputable surgeons and physicians, not only for themselves but for their families.

Dental Service.—The cost of this very necessary service to the industrial group can be materially lowered to them through the employment of a dentist by the mutual benefit association of the plant.

Sickness and Death Benefits.—Employes' health and insurance associations should be organized so as to prevent sickness and accidents. Each department should have a committee on "Health and Safety" which shall feel free to make recommendations regarding both.

Lunch Room Service.—Good, clean food at low cost can be supplied by organizing the shop force and by having a committee supervise the operation of the kitchen and dining room.

Banking and Loan Service.—Thrift is worth encouragement. We must provide a substitute for the loan shark. A little advice, along with a small loan, frequently relieves a great mental strain under which no one can be productive. Join with your force in organizing a building and loan association. Invest your funds in the good housing movement by building homes through this association. Encourage your men in home ownership; labor needs its stabilizing influence.

Education.—Education of the industrial worker needs no defense.

Recreational Facilities.—Recreational facilities are, of course, valuable. They have heretofore, however, been overemphasized by industry in comparison with the more fundamental factors mentioned above. The formation of a baseball team, a shop band, choral societies, giving of entertainments, are all useful in their way and can be made to contribute to this feeling of good will and cooperation between employer and employe.

None of the advantages accruing to the worker through the operation of service departments should in any way

Digitized by Google

substitute for a fair scale of wage, which must be made to keep pace with the ever increasing cost of living.

I have faith in industry. I believe it will help find answer to the Socratic question, "Is it not more important to teach men how to live than to teach them how to make a living?'"

Fume Poisoning from Nitric and Mixed Acid

By L. A. DeBlois

Engineering Dept., Safety Div., E. I. du Pont DeNemours & Co.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

MOST of us are probably familiar with the "strong nitric acid" of the laboratory or trade, which, though containing perhaps 30 per cent of water, is known as an extremely active and corrosive reagent, but it is those whose business is concerned with the nitration of organic materials by "mixed acid" (nitric and sulphuric) in which the nitric reaches 100 per cent strength, who are brought to full and perhaps sudden realization of what dangers can arise in the manufacture or use of a strong acid.

An acid "spill," the contact of acid with water, etc., the ignition or rapid decomposition of the material being nitrated, or even the exposure of small quantities of acid to the atmosphere may set free greater or less amounts of fumes. While the reddish gas, nitric peroxide, which may be formed abundantly under such circumstances is generally credited with being the chief cause of acid fume poisoning—or, as I would prefer to call it, "fume sickness"—it is probably not the only poisonous constituent of such fumes which are undoubtedly made up of poisonous gases and finely atomized acid carried in suspension. As the composition of these fumes varies greatly it is sufficient to include all under the term "nitrous fumes"—and, as far as I am aware, their effect on the human system varies only in degree.

INHALATION OF FUMES

The inhalation of dense nitrous fumes for a short time, or weaker fumes for a more prolonged period, may bring on a feeling of suffocation attended by coughing and local soreness in the upper air passages. The susceptibility to these effects and to the more serious attacks varies in individuals and we encounter many who claim immunity through continual exposure. The primary effects may perhaps be entirely relieved by going into the open air—in some cases such symptoms may be entirely absent, and in either event there may be no indications that a dangerous dose has been received. In fact, in most cases, fume sickness develops no further and the man returns to his work suffering no ill effects, but if the inhalation has been too great, after a period varying from an hour to a few days, the victim may become weak and short of breath. Sometimes a cough and abdominal cramps appear.

In fatal cases, the shortness of breath increases, with coughing and expectoration of a frothy, straw-colored sticky fluid, the blood is darkened and the veins engorged, and the man dies from suffocation which sometimes ends in a convulsion. The duration of the attack may be only 6 or 8 hours.

SECRETION WITHIN THE LUNGS

The above conditions are the result of edema (dropsy) of the lungs. A fluid is secreted within the lungs which fills the air-sacs so that air cannot enter them. Sometimes, if not enough fumes have been inhaled to cause edema, pneumonia may set in, but such pneumonia is not as a rule particularly severe unless the patient is already afflicted with some other complicating disease.

Digitized by Google

When the edema has once set in little can be done to arrest its progress, but in all cases of fume sickness it is our custom to at once administer chloroform. Fifteen drops should be added to a tablespoonful of aromatic spirits of ammonia and this shaken up in three-quarters of a glass of water and drunk in several portions. Careful investigation has not indicated that this is effective in preventing the development of the edema, but it undoubtedly gives some relief.

Where first-aid or hospital attention is not at once available, it is customary to keep chloroform at hand in individual doses (glass ampoules) with the necessary materials for mixing and administering the doses.

Perhaps the most important of the preventive measures is the promulgation among the men of a full knowledge of the dangers of nitrous fumes, the symptoms of fume sickness and the importance of immediate medical attention. So sudden is the development of the secondary stage of the sickness, and so unexpected, that the danger is an extremely insidious one and apt to be forgotten.

While we depend on our foremen and supervisors for continual vigilance in safeguarding their men against these attacks, we also issue small booklets to the men giving full information in a simple manner and in the necessary foreign languages. More complete information is contained in a booklet for foremen, chemists, etc., while additional informations is given to works' physicians and doctors practicing in the vicinity of our works.

Acid work does not, in our experience, attract the more intelligent grade of Americans, even with good wages, as much as the uneducated and often perverse foreigner. Such men are prone to come and go and are difficult to instruct.

PROPER VENTILATION

The correct solution of the fume sickness problem is proper ventilation, but this is not always easily accomplished, especially in the type of building used for acid work. My company has tried almost every known system and combination of systems and the excellent results that have been lately obtained were reached only after much careful and expensive experimentation on full scale.

This system, is, briefly, the handling of the fumes by large exhaust fans with the draft conducted downward from the source of the fumes with such vertical enclosures as may be practicable. In the case of cotton nitrated in earthenware pots, the latter are placed in partial enclosures and over slatted openings through which the fumes are drawn. Where the fumes were formerly rather heavy, the air in these rooms is now changed at the rate of 50 times an hour, the velocity through the slats being about 830 feet per minute with full opening and in some cases 2,500 feet per minute close to the top of the pot. General ventilation is obtained through ample windows and monitor roofs.

While systems like the above may handle the fumes produced in normal operation, they may be incapable of dealing with those thrown off in vast quantities if the product should "fire." In such emergencies the operators readily escape to the outside galleries or to the ground through emergency doors.

EXPERIMENTAL WORK

Considerable experimental work has been done in the neutralization of nitrous fumes by aqua ammonia or ammonium carbonate solution sprayed directly into the air by compressed air atomizers. These proved remarkably effective and not as expensive to maintain as would first appear, but were abandoned as better results were obtained when suitable exhaust systems were developed.

Another source of danger is the enforced entry into acid tanks or other receptacles for repairs, cleaning, etc. Tanks are washed carefully, and, if necessary, neutralized. Whether they can then be entered is determined by some one in authority, and, if necessary, oxygen helmets and lifelines are worn.

Investigations to prevent fume sickness were begun by my company a number of years ago though fatal cases were of very rare occurrence. Little or no information could be gleaned from outside sources either in this country or abroad and much that we know today about this

Digitized by Google

rare and insidious malady has come from the able work of Dr. W. G. Hudson. Lately as our field of operations has broadened and many new men have been employed the danger again assumed serious proportions. At our principal acid works in the most dangerous process employing 540 men in three shifts, under conditions which would have formerly been considered excellent, there were about 740 cases of fume sickness reported in the months of March and April, six of which were fatal. Though we still have much to learn, great improvements have been made, and in the past six months the number of reported cases of fume sickness has been greatly reduced and not one fatality has occurred.

Safety in Rolling Mill Operation

By Charles R. Hook

Gen. Supt., American Rolling Mill Company, Middletown, Ohio.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

IT is my belief that safety in a rolling mill and safety in any other industrial establishment is one and the same thing; that the determining influences in the one are the determining influences in the other.

There are three dominating factors that decide the extent to which the safety movement is successful in every establishment. They are:

1. The company policy.
2. The attitude of superintendents and foremen.
3. The attitude of the workmen.

It has been my privilege to visit a number of steel works and rolling mills and I have discussed the safety movement with many presidents and managers. When the Industrial Commission of Ohio appointed a committee to recommend rules and regulations for the guidance of the plants of the various industries of the State, I was appointed on the committee to report on steel works and rolling mills. In order that we might get the views of the management of various plants, our director of safety made a tour, taking in plants not only in Ohio, but also in West Virginia and Pennsylvania.

LARGE EXPENDITURES FOR SAFETY

From all the investigations I have made, and from all the information I can gather, I feel safe in making the statement that, without exception, rolling mill companies are furnishing all the mechanical safeguards that can be properly used.

It has been often and well said that "the best safety device is a careful man." The biggest and the most important problem, therefore, is the building up of an organization of careful men.

Company policy can very largely influence the attitude of superintendents and foremen and the attitude of the workmen. While practically all companies have been most liberal in their expenditures for safety devices and safety organization, many, I think, have failed to realize the real scope of the safety movement, and have overlooked some of the influences which tend to make safe men.

The company should interest itself in all the civic movements for better sanitation, better streets and better homes. It should encourage the planting of flowers, the developing of beautiful lawns, and the cultivating of vegetable gardens.

Will any one doubt that the man who spends his spare time among flowers, developing a lawn or cultivating vegetables, is a *better citizen and a safer workman* than he who spends his spare time in idleness or at the corner saloon?

We now come to the second factor, the attitude of the superintendents and foremen, and I must confess that this phase of the problem has given me almost as much concern as the third factor.

There is no man in an organization who needs the co-operation of all the other men any more than the director of safety. Too often the department super-

Digitized by Google

intendent or foreman takes the view that the safety department is responsible for the safety of the plant and that the department's responsibility is ended when an unsafe condition is reported. Many times unsafe conditions are not even reported, foremen expecting the safety department to find all such cases.

VIOLATION OF SAFETY RULES

In many instances superintendents or foremen, considering themselves as having more "official authority," violate rules that are set up for employes. Many men are influenced by the actions of their leaders and imitate them; hence if foremen or superintendents assume an unconscious indifference toward the importance of "Safety First" rules, it can hardly be expected that employes will attach great importance to educational notes, posters, or notices.

When our department superintendents fully realize the extent to which tonnage and costs are affected by the attitude taken by the workmen toward the safety movement, they will be more enthusiastic in their own support of the movement. They will take a greater interest in the things on the outside that affect the men when they get on the inside. They will exhibit more patience and put forth a more determined effort to give the workman the proper viewpoint.

PUT YOURSELF IN HIS PLACE

If I were a foreman in a machine shop or any other division of a rolling mill, and I saw a man doing something in an unsafe way or making careless movements, I would take his place temporarily and do the job in the safe way or make the movement in a careful manner. If he was doing something with the machinery moving when he should be doing it with the machinery stopped, I would prove to him that he would have time and prevent the possibility of a serious accident by stopping the machinery. A positive, practical demonstration will do more toward making a lasting impression, and a safe man, than all the reprimands you can inject into a day's work. I would be very careful *not* to demonstrate by doing a job in the wrong way.

Three years ago a shearman in our sheet mill department had the end of one finger cut off because he got his hand too close to the shear blade when trying out the "set" of his knives with a piece of paper. It happened to be near the end of his turn and the shearman who followed him was present at the time. After the unfortunate man was taken to the emergency hospital for attention, the shearman who followed proceeded to demonstrate "how it all happened" to a group of workmen who had assembled and were discussing the accident. He took a piece of paper, laid it on the lower knife, allowing his hand to protrude slightly over the edge, at the same time thoughtlessly and wholly unconsciously stepping on the clutch treadle with the result that the upper knife came down and took off parts of two of his fingers. That was the wrong kind of a demonstration. No mechanical guard can prevent this class of accident—it is entirely a matter of the mind.

Our engineering departments, assisted by our superintendents and foremen, spend hours and hours and hours of the most concentrated thought devising ways and means of controlling the travel and direction of an ingot, a billet, a bar, or plate; but I am fearful that the same concentrated effort is not used, or a like amount of planning done, in an endeavor to control and direct the operations of the human mind.

ATTITUDE OF WORKMEN

The third and most important factor is, of course, the attitude of the workmen.

When we take into consideration the amount of money that has been spent for safety devices, for safety organizations, for signs, for bulletins and for exhibitions and educational campaigns, we can very properly expect more sincere cooperation and better support than we are getting from the average workman. The chances that men take unnecessarily are almost unbelievable.

Why will men persist in refusing to wear goggles when they are chipping; why will they crawl under a train of cars to take a short cut; why will they clean a machine while it is in motion

Digitized by Google

after they have been repeatedly told to shut it down when cleaning and have even been threatened with discharge if caught cleaning while the machine was running?

INDIFFERENCE AND CARELESSNESS

The safety director of the State of Ohio told me that he was confident that not less than 25 per cent of the accidents were due to absolute indifference and carelessness. Mr. Yaple, president of the Ohio Commission, believes that at least 75 per cent of our industrial accidents are preventable. If these statements are true, and I have not the least doubt but what they are, what factor has the greatest bearing on reducing the number of preventable accidents? I say without fear of successful contradiction that it is the attitude of the workmen.

The workers' psychology is the problem demanding our most sincere and intensive study if we are to make any great advance beyond what has already been accomplished.

Industrial Safety Conference

THE first New York Industrial Safety Conference will be held in Syracuse, December 12 to 14, 1916. The conference has been called by the State Industrial Commission to aid in its campaign to set so high a standard of safety in the factories of New York State that it will be accepted as the standard of industrial safety throughout the country. James M. Lynch, chief of the industrial commission's inspection bureau, is chairman of the committee in charge of arrangements for the conference. Associated with the commission and cooperating in its work are the National Safety Council, the Associated Manufacturers and Merchants, the Central Contractors' Association, the American Museum of Safety and the National Electric Light Association.

Judging from the number of acceptances already received by the State Industrial Commission, there will be a record-breaking attendance at the New York State Industrial Safety Congress scheduled for December 11, 12, 13 and 14 at the Hotel Onondaga, Syracuse.

The program for the Congress, as arranged, is as follows:

Monday, December 11—1:30 p. m.

Address of Welcome: Hon. Walter R. Stone, Mayor of Syracuse.

Introductory Remarks: James M. Lynch, State Industrial Commissioner and President of the Congress.

Address: Hon. Charles S. Whitman, Governor of New York.

Addresses:

"Duty of Employers in the Matter of Prevention of Accidents and the Conservation of Health of Employes." George Pope, President, National Association of Manufacturers.

"Duty of Workers in Co-operating with Safety Organization for Conservation of Life, Health and Limb." Samuel Gompers, President, American Federation of Labor.

"Attitude of New York Organized Industry Toward the Safety Movement." E. J. Barcalo, President, Associated Manufacturers and Merchants of New York.

"Attitude of New York Organized Labor Toward the Safety Movement." James P. Holland, President, New York State Federation of Labor.

Evening—8 p. m.

Presiding Officer: Miss Gertrude M. Beeks, New York; Secretary, National Civic Federation.

General Topic: "Women in Industry."

Address: Dr. Lucy Bannister, Westinghouse Lamp Company, Bloomfield, N. J.

Tuesday, December 12—9:30 a. m.

Presiding Officer: Louis Wiard, State Industrial Commission.

General Topic: "Machinery Hazards."

Addresses:

"Guarding of Elevators, Cranes and Moving Machines." John Price Jackson, Commissioner of Labor, Pennsylvania.

"Why Preventable Accidents Occur on Fixed Machinery." Dr. F. L. Hoffman, Statistician, The American Museum of Safety.

General Discussion.

(Each speaker limited to 10 minutes.)

Afternoon—2 p. m.

Presiding Officer: W. H. H. Rogers, State Industrial Commission.

General Topic: "Machinery Hazards."

Addresses:

"Safety and Efficiency." C. W. Price, Field Secretary, National Safety Council.

"What Statistics Should Be Reported Under Compulsion?" Leonard W. Hatch, Chief Statistician, New York State Industrial Commission.

General Discussion.

(Each speaker limited to 10 minutes.)

Digitized by Google

Evening—8 p. m.

Presiding Officer: Thomas M. Gafney, Syracuse; State Industrial Council.

Illustrated Lecture under auspices of National Safety Council.

Wednesday, December 13—Fire Hazard Day

Morning—9:30 a. m.

Presiding Officer: John Mitchell, State Industrial Commission.

General Topic: "Classification of Buildings and Materials of Manufacture as the Basis for Safety Requirements."

Address: James C. Heckman, Chairman, Technical Advisory Board, Associated Manufacturers and Merchants; General Superintendent, Larkin Company, Buffalo, New York.

General Discussion.

(Each speaker limited to 10 minutes.)

Afternoon—2 p. m.

Presiding Officer: Edward P. Lyon, State Industrial Commission.

General Topic: "Occupancy and Its Relation to Exit Facilities from the Viewpoint of Life Hazard."

Address: H. W. Forster, Chairman, Committee on Life Hazard, National Fire Prevention Association; General Manager, Independence Inspection Bureau, Philadelphia.

General Discussion.

(Each speaker limited to 10 minutes.)

Evening—8 p. m.

Presiding Officer: John C. Clark, Buffalo; State Industrial Council.

Illustrated Lecture under auspices of American Museum of Safety.

Thursday, December 14—Sanitary Hazard Day

Morning—9:30 a. m.

Presiding Officer: C. A. Chase, Syracuse; State Industrial Council.

General Topic: "Factory Conditions and the Shop Committee."

Addresses:

"How to Save Money by Installing a Safety Organization." Carl M. Hansen, Managing Director, Pennsylvania Mutual Liability Association, Philadelphia, Pa.

"Practical Benefits Derived from Safety Organization." John A. Robertson, Manager, Camera Works, Eastman Kodak Company, Rochester, N. Y.

General Discussion.

(Each speaker limited to 10 minutes.)

Afternoon—2 p. m.

Presiding Officer: R. C. Stofer, Norwich; State Industrial Council.

General Topic: "Light, Heat and Ventilation."

Addresses:

"Factory Lighting and Its Bearing on the Health and Productivity of Workers." Louis B. Marks, New York.

"Heat and Ventilation and Their Bearing on Health and Productivity of Workers from the Viewpoint of the Physician in Industrial Practice." Dr. Charles A. Lauffer, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

"Heat and Ventilation and Their Bearing on Health and Productivity of Workers from the Viewpoint of the Ventilating Engineer." C. A. Booth, Buffalo Forge Company.

New York Civil Service Positions

The Municipal Civil Service Commission, of New York City, will shortly hold examinations to fill vacancies in departments as they may occur.

In the fire department positions as inspectors of fire alarm boxes are open at salaries ranging from $1,400 to $1,500 per year. The duties are those of inspecting boxes in shops and in the field; repairing minor parts, testing circuits, cleaning boxes, etc. Candidates must be at least 21 years of age, must have had 3 years' experience in some factory making cables, insulation or signaling apparatus. They will be tested on their knowledge of different types of fire alarm boxes, electrical connections to lamp posts and conduit cables, methods of detecting breaks or other trouble in circuits, etc.

A position as civil service examiner (salary $2,700) is also to be filled. The duties of the position are to prepare and grade examination papers for positions in the city service requiring a knowledge of civil engineering. Applications must be filed before November 27. For further details apply to the Municipal Civil Service Commission, Room 1400, Municipal Building.

Applications will also be received by the commission until November 28, for the position of Mechanical Engineer, Grade E, at a salary ranging from $2,280 to $3,180 per year. The duties of the position are to perform engineering work in connection with mechanical equipments, power and heating plants, lighting, plumbing, refrigerating and elevator systems. Further particulars may be obtained from Robert W. Belcher, secretary of the Municipal Commission.

Digitized by Google

Letters to the Editors

MR. SMART OF PENNSYLVANIA

Editors, SAFETY ENGINEERING: The following from Bradford, Pa., shows what some progressive manufacturers are doing to protect their workers:

Bradford, Pa.

"Gentlemen:—We have locked our Tools in Burglar Proof Safes and as the boys come in each morning we chain them fast to the walls of the Plant. This is about the best we can do for their safety."

It is no wonder that an employer, who places so little confidence in the intelligence and integrity of his workers, should assume the attitude this one has. It would, however, be well to call to his attention the fact that unless the point of contact between the chain and the "boys" is properly made abrasions may occur, which may result in blood poison and serious injuries. He has not mentioned pads on the walls. Doubtless that precaution would add somewhat to the welfare and safety of his plant. As an extreme precaution, it might be well for him to lock the doors of his plant, with all of the "boys" outside; then he can dodge the responsibility he now assumes under the compensation act, and at the same time remove the employes, in whom he takes such a vital interest, from the degrading influence of an employer whose attitude is what the brief letter indicates. Incidentally it might interest this party to know that George Washington is dead. PRO BONO PUBLICO.

A NEW DANGER SIGN

Editors, SAFETY ENGINEERING: It is maintained that simplicity is a desirable quality in safety devices, including safety and danger signs and signals. No one has attacked the fundamental principle of simplicity as such, but occasionally we find an application of the principle which is so liberal that it becomes contradictory. Such is the case with a new danger sign which consists of the old universally accepted sign with a few "frills" and complications. The designer's motive has not been divulged, but in view of the doubtful merit of the design, such a revelation is in order for the information of people who hail from my State. Let us be shown! I refer to the red circle superimposed on the white cross.

MISSOURI.

Near Accidents

Safety Bulletin, Illinois Steel Company

RECENTLY two of the standards on a freight car broke and about 150 or 200 pieces of 1¼-inch plain end pipe rolled off the car. It was fortunate that no one was near the car when the standards broke or there might have been a serious accident.

A shipper was in charge of the loading of this car and failed to have same properly wired. He has always been careful and very much interested in his work and on this day he had loaded 8 cars; the car referred to was finished at 5:30 p. m. He was of the opinion that the men who were loading the car would wire same and the men thought that he would leave a note for the night turn to wire it. Through this misunderstanding, the matter was neglected. The standards which were used would have carried the load had the car been properly wired.

The shipper was suspended for a period of two weeks and, in addition, all shippers were talked to about this accident and their attention called to the importance of wiring all cars even though they are only for inter-plant points.

Digitized by Google

Fifth Annual Safety Congress

THE National Safety Council's Fifth Annual Safety Congress, at the Hotel Statler, Detroit, October 17 to 20, was the most important and successful congress the Council has held. The importance of the papers and the prominence of the speakers attracted safety officials, employers, insurance and labor department representatives, etc., from all parts of the country.

The retiring president, Arthur T. Morey, guided the National Safety Council through the year of its greatest progress, as the membership reports and the financial statement demonstrated. A number of new local councils were started in 1916 and, under Mr. Morey's administration, the Council held under its auspices, for the first time, a Safety Exhibit in connection with the Annual Safety Congress. This also proved a great success, having attracted over 8,000 visitors. The banquet was attended by between 500 and 600 persons.

J. M. EATON,
President Detroit Local Council, Superintendent Cadillac Mutual Benefit Society of Cadillac Motor Car Company.

The new president, L. R. Palmer, of the Department of Labor and Industry, Harrisburg, Pa., has been closely associated with the National Safety Council since its formation. Under Mr. Palmer's guidance the Council will continue its career of successful service to the industries of America as the foremost association for the protection and welfare of industrial America. As one of the pioneers of the National Safety Council Mr. Palmer has served it well and appreciation of his efforts to advance the cause of industrial safety is manifested by his election to the presidency.

As chairman of the Committee of Arrangements of the Fifth Annual Safety Congress, Mr. Eaton, by his untiring efforts contributed in no small measure to the success of the Congress. Praise for his work was heard on all sides. In addition to his exacting duties as the executive of the committee he made the address of welcome and presided at the Employes' Benefit Association Sectional Meeting, making an address on "The Statistical Basis for Assessments and Benefits."

The National Safety Council is exceptionally fortunate in possessing as its secretary, Mr. W. H. Cameron. The work Mr. Cameron has done in the past and is now performing for the National Safety Council is beyond all praise. He demonstrated long ago that he is blessed with a remarkable capacity for doing things, with great success. The great growth of the National Safety Council is due in no small measure to his almost superhuman efforts, put forth day by day throughout the year. The influence of the Local Councils is becoming a powerful aid in educating employers to the benefits to be derived from membership.

The National Safety Council looks forward to 1917 as the greatest year in its career, and SAFETY ENGINEERING offers its congratulations to the officers and all others who contributed to the success of the 1916 Congress.

Digitized by Google

EDITORIAL

"Safety First" Includes The Fire Hazard

IN the campaign to safeguard life and property against injury and destruction a knowledge of fire fighting, fire prevention and fireproof products is a valuable assistance to the safety official. To provide the safest possible conditions for industrial workers, the buildings in which they are employed should receive the same careful attention as the machinery and other hazards of industry. It cannot but be admitted that the fire hazard is often overlooked in an industrial safety campaign. Many safety meetings are held in buildings that are firetraps. As the greatest hazard to a building is the fire hazard, the same care should be given to the design and construction of a building, to make it as safe as possible against fire destruction, that is shown in safeguarding dangerous machinery to protect the workers.

The tragedy of a person burned to death is as deplorable as death from any other injury. Fire has taken a terrible toll both of life and property because its hazard has not been rightly considered. A consideration of fireproof construction, fire preventive equipments and the design of buildings to render them safe against the spread of fire belongs, fundamentally, in every safety campaign. The industrial plant which is not constructed against fire destruction or which is not equipped with fire fighting apparatus is not a safe place to work in.

Fire is man's most relentless foe, destroying everything that comes in its path. We never know when fire will make its appearance. It sounds no warning. It appears at any hour of the day or night to do its destructive work.

Fires are prevented by removing the causes of fire, by providing the means for preventing or extinguishing fire and by educational campaigns among employes on the importance of carefulness. Fires and accidents are the hazards every safety campaign strives to reduce. Both are equally important and should receive equal attention.

It is noticeable at most exhibits of safety devices that a display of fireproof materials, fire fighting apparatus and fire preventing equipment is not visible. Manufacturers of these products should realize that they belong in such exhibitions. There is the same need for their products as for the devices and apparatus that safeguard life and property against accidents. They should avail themselves of the opportunity to call attention to the necessity for safety against fire, as the manufacturers of safety devices are doing to show what can be accomplished in protection against accidents. "Safety First" includes the fire hazard as much as the accident hazard.

Digitized by Google

Safety Work in Gas and Electrical Industries

Special Problems of Public Service Companies to Protect Their Employes and the Public

Safety and Efficiency—How a New Member Tackles the Problem

By Julien H. Harvey, Supt. of Efficiency, The Kansas City Railways Company.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

IN electric railway work the application of safety ramifies into so many channels that it becomes but a synonym for efficiency, and while efficiency may include other things than safety, yet safety, properly applied, cannot mean other than efficiency. In my remarks I shall confine myself to an analysis of the work of the Kansas City Railways Company—the necessity for the campaign, our preliminary work, our plan of organization, what has already been accomplished, and, more particularly, what is to be done in the future. This will be gone into in some detail and will have to do more with relations to the public than with safety to our own employes.

INCREASE IN VEHICULAR TRAFFIC

Like all cities, the enormous increase in vehicular traffic, and the natural increase thereby in congestion, the uniformly narrow and hilly streets of Kansas City, and an apparently growing carelessness on the part of the public, had led to a gradual increase in the accidents on our system. Combined with this we have found ourselves surrounded by a network of the common snitch lawyer and a public state of mind so prejudiced that the cost of our claim and legal department was found to be reaching unreasonable bounds. We had therefore come to the point where it was felt that one of the most important matters to be dealt with was the question of accident prevention, and that a "Safety First" campaign properly and thoroughly conducted would be of value, not only in the reduction of accidents and accident costs, but also in the moral effect it would have upon the public mind. In the past we have done more or less safety work within our own organization, such as a daily investigation of all accidents reported, periodical meetings of trainmen for the discussion of accident prevention, posting of bulletins, and safeguarding machinery, but we have never gone to the public with an appeal to them.

PLANNING SAFETY CAMPAIGN

Determined on a campaign, the first consideration was a thorough study of what other cities had accomplished. A representative was accordingly despatched to some half-dozen of the largest cities in the country where campaigns had been carried on successfully, for the purpose of obtaining from them first hand information as to their methods of safety work. From these companies we found the lines along which they had traveled from which best results had been obtained, and also the weak spots, if any, in their work.

The next step was to secure a membership in the National Safety Council, with the immediate thought of availing ourselves of their wide experience in organization work, and later on to benefit through their bulletin service and other activities.

After the program was decided upon, the next step was the appointment of a general safety committee, composed of a representative of the claim and legal de-

Digitized by Google

partment, the publicity agent of the company, and the superintendent of efficiency. This committee will have absolute charge of and be responsible for the working out of the campaign. Directly under this committee there will be a supervisor of safety, whose entire time and attention will be devoted to safety work. In selecting a man for this position it was felt that better results could be obtained if a man could be found within our own ranks who was qualified to handle the work.

Next was organized a central safety committee, composed of the heads of 9 departments, to which accident hazard either directly or indirectly relates, and then in turn departmental and local committees were formed.

DETAILS OF THE WORK

As definitely decided upon our work has been planned as follows:

1. Public: (*a*) Schools. (*b*) Vehicle drivers and owners. (*c*) General public.
2. Employes: Our own organization.

Most of our school work will be along the line that is familiar to you all, and includes the use of calendars, blotters, safety league buttons with different designs and colors for the various schools, motion pictures, lectures, and one other feature to which I would like to call your particular attention. This is the use of a monthly bulletin (11 x 22 inches) in each school room. The bulletins contain certain safety rules and will be accompanied for the teacher's use, by a short lesson on the points covered. In the Kansas City grade schools the curriculum includes a course on hygiene and sanitation, and the board of education, which has met us at all times with the most cordial support and co-operation, has allowed us not only to place these bulletins in the various rooms, but has also given instructions for the teachers to use them as a part of the course on hygiene and sanitation.

LETTERS AND PAMPHLETS

The next division of our work is in connection with vehicle drivers and owners. For them we have prepared a series of form letters dealing with the different phases of safety work, and at periodical times these will be sent to some 14,000 drivers and owners in Greater Kansas City. With the first letter will go a small pamphlet on vehicle accidents and how to avoid them—containing the indorsement of every organization concerned.

Another phase of the work from which it is felt good results should come will be in connection with the calling to the attention of careless drivers, specific instances of their carelessness. This was one of the first things gone into and a ready response has come from all those interviewed, especially from the owners of large numbers of vehicles. It appears to me that the more direct work we can do with the individual, the better the results will be.

The third branch of our work will have to do with the general public. This was started with a series of dash cards which will be changed weekly on all cars, and contain various safety suggestions. The reverse side of our transfers is being utlized for safety suggestions, and on our stationery the company is asking the co-operation of the public.

The Kansas City schools are given over on certain afternoons to parents' meetings and on certain evenings to community center work. We are arranging to reach all of these organizations during the winter, and will show moving pictures, distribute literature and have lectures covering safety work in general.

The last phase of the work is that within our own organization, and after all is said and done, it is our belief that in the final analysis the most effective work will come from within our own ranks. The average employe, awake to his own best interests, will in a campaign such as this have a selfish motive, whereas no matter how strong an appeal you make to the general public it will be found that they do not have this same selfish interest and as a result their support cannot be as thoroughly enlisted as can that of the employe.

With the idea in mind of keeping the employes interested in the campaign, and in order to give them a definite idea of the work being done, a large accident chart was placed on the trainmen's bulletin board, showing the accidents day by

Digitized by Google

day, both in figures and by lines and curves, with the work for the corresponding months of the preceding year. It is our aim to place something new on the bulletin board each day so that the men will form the habit of continually watching it.

After the organization had been perfected and we were ready to start actual work it was felt that it would be desirable to commence the public work with some movement that would attract widespread attention. For several years we had encountered more or less trouble with newsboys on our cars and this had resulted, not alone in accidents, but had also been a continual nuisance to the general public. Many requests had come to us at various times from the board of public welfare and various other organizations asking that this practice be stopped. Therefore, as a first shot in our "Safety First" campaign, large placards were placed in all cars announcing that after a certain date newsboys would not be allowed on cars. The newspapers commented editorially on the new ruling and spoke of it in commendatory terms. Also many letters from the public were received endorsing the step.

About this same time a local council of the National Safety Council was organized, and we feel that through the work of this council, be it individual, public, or industrial, the impression will be created, and rightfully so, that our safety work in Kansas City will not be a one-man movement, but will ramify into many lines.

Our campaign has now been in motion for about 30 days—scarcely time enough to feel any real effects. What the result will be we can only prophesy, but I am confident that there can be but one answer, and that a good one.

Accident Prevention in the Commercial Department of a Large Gas Company

By G. W. Clabaugh

Vice-President and Secretary, Omaha Gas Company, Omaha, Neb.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

BUT comparatively a few years ago you could not have held this convention. No one was, or seemed to be, interested in humanity or the conservation of that vital force found in every man, that makes for progress and advancement in the business world. We were following the old Roman custom, the survival of the fittest, and as labor was plentiful and life cheap, no thought was given to the prevention of accidents and ofttimes death, in our manufacturing industries.

It has been said, and truly, that "man's inhumanity to man makes countless thousands mourn." I do not believe that it could be said today, with all the inventions used for the preservation of life and limb. Has this all come about because, from a monetary standpoint, it pays? I do not believe so. I think that every man recognizes what he owes in this world to his fellow being, and it is because of this that we meet here today, to devise ways and means for greater progress than we have already made.

As I interpret the slogan "Safety First," it means that everything within our power should be done to lessen the danger of accidents. This being so, it is, therefore, necessary that all employers of labor should build their factories in such a manner as would comply with the latest sanitary requirements, as proven by our scientists, not only because it pays from a healthful standpoint, but financially as well, for we all know that men physically well cared for

Digitized by Google

are in a better condition to do work efficiently, and with brains clear, are less liable to accident than the men physically unfit.

It naturally follows that contentment brings greater efficiency, happiness and loyalty than any other factor in life. It, therefore, behooves us to bring about these conditions among our employes if we wish to reap the highest reward of their labor. It is discouragement and discontent that cause carelessness, and we all know that carelessness is the cause of 90 per cent of the accidents which happen. A working man, well treated, fairly paid and cared for, will give the best returns to his employer, for the money expended, of any investment I know of.

There are but few accidents in the commercial department of a gas company, yet there may be many eye strains caused by imperfect illumination. The little rubber band on the floor may become as dangerous as the banana skin thrown on the pavement by the careless pedestrian. Worn wooden floors may be the cause often of tetanus by a sliver breaking off and running into the foot.

Analysis of our personal injury accidents sustained by employes in the commercial department and distribution department during the past four years ending August 31, 1916:

Causes of Accidents.	Distribution	Commercial	Total	Per Cent
Affected by gas	12	0	12	4.2
Foreign bodies in eyes	40	0	40	14.0
Falls from motorcycles and bicycles	35	0	35	12.3
Dropping objects on feet	8	0	8	2.8
Punctured wounds from oil can spouts	3	1	4	1.4
Stepping into pits, etc	4	1	5	1.7
Wounds from splinters, wire and nail ends	16	1	17	5.9
Employes struck by wagon and team	3	0	3	1.0
Laceration due to cracked lamp shades	10	0	10	3.5
Ruptures from lifting, etc	4	0	4	1.4
Stepping on nails	8	2	10	3.5
Injured on elevators and hoists	0	1	1	.3
Handling tools	28	1	29	10.2
Trenches caving	1	0	1	.3
Handling materials, etc	15	0	15	5.2
Bitten by dogs	8	20	28	9.8
Blood poison and erysipelas	3	1	4	1.4

It is gratifying to note that only 4.2 per cent of the accidents were caused by inhalation of gas, and we attribute this fact to the strict rules governing our men in working with gas, and also to the use of respirators by men engaged in repairing bad leaks in our mains and services.

In carefully examining these accidents, it is found that about 80 per cent of them were due to some carelessness on the part of the employe himself, hence it is very important that the men should be continually reminded *to be careful.*

METHODS USED TO MAKE EMPLOYES CAREFUL

(a) *Bulletin Boards:*

Bulletin boards are placed in conspicuous places in each department, and each week bulletins issued by the National Safety Council are posted. At the end of each month a list of accidents sustained by employes, and suggestions for preventing them are also posted on these bulletin boards. These notices do not give the name of injured, so are not personal.

We recently mailed a letter to each employe at his home, showing the accidents which had occurred during the past month, as we thought this would give his family a chance to see what ac-

Digitized by Google

Injured on parts of wagons and vehicles	15	0	15	5.2
Meter readers striking against objects in cellars	0	3	3	1 5
Struck by flying objects	2	0	2	.7
Burns from appliances and lamps	9	0	9	3.6
Falling on stairways, walks, etc.	0	1	1	.3
Step-ladder accidents	6	0	6	2.2
Riding on street cars	3	2	5	1.7
Totals	241	43	284	100.0

cidents occur, and also get them interested in the subject of "Accident Prevention." We feel that this was a good thing and expect to repeat it occasionally.

(b) *Accident Hazard Inspection:*

Each month we have a selected man make an inspection in each of our departments, covering all buildings, and also watching methods used by men in their work. We believe it is best to have a man make these inspections who is not on the ground each day, as he will be more keen to pick out the little things which, if neglected, might later result in a serious accident.

(c) *Record of Accidents:*

We keep on file, a card for each employe, showing his occupation and department, and also a record of each accident he has sustained, or was in any way responsible for, and when we find a man is frequently getting hurt, or causing some damage by his carelessness, we call the attention of his foreman to this fact, and suggest that he be cautioned in regard to being more careful.

TRAP DOOR ACCIDENTS

We have in the past had several accidents due to consumers falling through openings, caused by meter readers leaving trap doors open upon leaving the premises, but in recent years the number has been quite small, which fact we attribute to the continuous employment of meter readers. When we paid a commission for each meter read, the men were in a hurry to read as many meters as possible, were naturally careless, and did not become familiar with the premises, as our present meter readers do.

A notation is also made on the meter reader's book at each location where there is a trap door that has to be opened and closed in doing their work, to "Close Trap Door," and this is placed with a rubber stamp in large type.

STOP BOX ACCIDENTS

Our attention has been called to several accidents caused by people tripping over gas stop boxes which project above the level of the sidewalk. Many injuries have resulted quite seriously, and we decided this summer to make a thorough inspection in Omaha on all streets where we have gas mains, and lower all projecting stop boxes. This work will probably be completed in a few weeks, and to date we have lowered nearly 4,000 stop boxes.

After summing up this whole question, you will note my conclusions are that by treating your employes as *men*, and not as slaves, you will engender a spirit of co-operation which will revert to the good of your business not only in lessening the number of accidents but in increasing efficiency. Then, when taps are sounded and the bugle call can no longer be heard, the employe will go to his long resting place with the memory of a faithful service, and the refrain will no longer be, "Rattle his bones over the stones; he's only a pauper whom nobody owns."

Digitized by Google

How the Safety Movement Is Helping the Electric Railway Meet Its Problems

By Henry H. Norris, Associate Editor, Electric Railway Journal, New York.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

THE topic assigned for this paper suggests as a preliminary inquiry, "What are the electric railway problems with which safety work is intimately or remotely connected?" In order to clear the ground an attempt to answer this query is first in order. Eliminating from consideration all railway problems very remotely concerned we may divide the remainder in two ways:

1. Those problems in which money considerations are involved, and others in which the financial aspects are secondary.
2. Those which bear on the relations of a company with the public, and those in which only employes are concerned.

The most critical problem in the electric railway today is how, while maintaining good service, to preserve a reasonable net return on investment in spite of increased service requirements on one hand and decreased income, as measured by purchasing power, on the other.

Next in importance is the preservation and cultivation of good will on the part of the public, so that reasonable operating conditions may be assured and the confidence of investors maintained.

A third problem is the fostering of such relations with employes that loyalty and co-operation may be fostered for the purpose of aiding in the solution of the other two.

Suppose then that we ask ourselves these pertinent questions: (1) Does systematic safety work pay in dollars and cents? (2) Does it pay in fostering public good will? and (3) Does it conduce to loyalty on the part of employes?

DOES SAFETY WORK PAY DIRECTLY?

The writer has put this question to men active in safety work without receiving a satisfactory answer, if by directly paying a mathematically determinable profit is meant. The difficulty of striking a balance between debit and credit is so great that it seems unnecessary to attempt it, particularly when the indirect returns are most important after all. In general, where money is being invested in this work accidents are being reduced, but just how much of this is due to any one line of effort is difficult to determine.

But with safety work, if the accidents are becoming less numerous, considered with relation to the risks involved, it is wise to invest money regardless of direct, measurable return. However, returns are not always intangible. For example, it is claimed that the result of the 1914 campaign in Montreal was an immediate reduction of 50 per cent in the number of suits for damages against the railway, and with smaller average claims.

DOES SYSTEMATIC SAFETY WORK FOSTER PUBLIC GOOD WILL?

In the case of the electric railway it should be understood that this industry is active in safety work because it desires (1) to reduce accident expense, (2) to prevent the resentment which the public is sure to feel against the railway in case injury is inflicted even when the railway is blameless, and (3) because the men who operate the railway individually and collectively deplore the suffering and hardship which accompany accidents, even when the injured one is solely to blame.

The Boston Elevated Railway has been very active in safety work and has enjoyed greater public confidence as a result. The work was recognized by the American Electric Railway Association in the award of the Brady medal in 1914. Hon. Russel A. Sears, attorney for the company, has summarized the advantages of systematic safety work as far as the attitude of the public is concerned as follows: (1) The company gets wholesome advertising; (2) confidence is inspired on the part of employes, the stockholders, and the public; (3) beneficial effects

Digitized by Google

upon the public authorities with which the company has to do business; (4) an indirect effect upon judges and juries; (5) eventually money is saved to all three parties concerned, and (6) there is a satisfaction which comes to all those who are active in the work.

EDUCATIONAL AND ADVERTISING ACTIVITIES

Undoubtedly one of the greatest factors in developing a friendly attitude of the public toward the railways is advertising; another is educational work in the schools, church clubs, etc. Safety propaganda makes good advertising copy, especially if it has a local flavor.

Illustrating the last-named point, the Boston Elevated Railway, on receiving the Brady medal award, published a full-page advertisement in every one of the Boston papers and printed the brief submitted to the judge in pamphlet form, distributing copies to stockholders, public authorities, associations, clubs, libraries, and elsewhere, and as a result received many letters of commendation.

But the best work in the publicity line is that done through the public schools, because it lays a foundation for big future possibilities. No phase of accident reduction activity has met a more ready response and is more potent in fostering good will in the homes. Children are safety missionaries and carry the gospel everywhere.

Essay competitions and Safety Scout organizations are among the possibilities here. In the essay contest held last winter by the Connecticut Company, New Haven, Conn., more than 1,000 compositions were submitted from 37 towns. Among the places where the Safety Scout idea has worked out well is Tacoma, Wash., where early during the past summer, under the guidance of the Tacoma Railway & Power Company, 1,347 pupils had achieved full Safety Scout honors.

DOES SAFETY WORK MAKE BETTER EMPLOYES?

Much of the best definite electric railway safety work is done among employes. The principles which must be followed in safety work organization were clearly stated by Dana Webster, inspector with the Aetna Life Insurance Company, in a paper read at the Central Electric Railway Association Convention in February, 1916. They are:

(1) Ascertaining the actual conditions of a risk under which employes in any institution perform each task, and determining the practical possibilities of eliminating or reducing this risk.

(2) The provision of proper working conditions and of efficient safeguards for dangerous conditions or for dangerous machinery and appliances.

(3) The careful selection, instruction, and supervision of workmen and their assignment to work for which they are not unsuited.

(4) The promulgation of rules for safeguarding, and their rigid enforcement.

(5) The inculcation of habits of caution in the minds of all.

SAFETY WORK GREAT ASSISTANCE

That electric railways are endeavoring to carry out safety work in accordance with the principles stated by Mr. Webster is indicated all about us. H. A. Nicholl, general manager of the Union Traction Company of Indiana, Anderson, Ind., has taken the trouble to say that the safety movement has been of great assistance to him in the management of this great property, by bringing the entire organization into contact and creating good feeling all round.

The mechanical department of the Brooklyn Rapid Transit Company gets out a quarterly illustrated pamphlet, The Union Traction Company of Indiana issues a safety magazine, and The Toledo Railway & Light Company recently sent four committees of trainmen to other cities to study safety methods. If by these and other means the men can be interested they are in a position to be of great help to the management as they are in such close touch with the details of everyday work.

The stimulation and particularly the maintenance of interest in this matter is, of course, one of the difficulties in this work, and many plans are being tried. Schemes must be devised to keep before the men that their efforts are keeping down the number of accidents, that if vigilance is relaxed they will increase again.

Digitized by Google

Conference of Fire Prevention Associations

PURSUANT to the action of a similar meeting in 1915, a conference of representatives of State fire prevention associations, and of any others interested in the subject, was held Friday, October 6, in the assembly hall of the Chicago Board of Fire Underwriters, the time being selected in order to take advantage of the attendance of field men upon the Fire Underwriters' Association of the Northwest. Eleven State associations were represented, and the meeting was attended also by F. J. T. Stewart, chairman of the executive committee of the National Fire Protection Association; J. C. McDonnell, of the Chicago Fire Prevention Bureau; E. R. Townsend, engineer for the Western Union; W. S. Boyd, electrical inspector for the Western Union; F. M. Griswold, general inspector for the Home of New York; Benjamin Auerbach, representing the committee on publicity and education, and others.

A. C. Speed, of Ohio, was elected chairman, and T. R. Weddell, of Chicago, secretary. The principal subjects discussed were: Fire prevention talks in the public schools, co-operation of neighboring fire departments against conflagrations, the best way of handling small town inspections, and methods of securing the co-operation of local agents.

W. O. Chamberlain, Minnesota State agent of the Commercial Union, spoke on how to interest school children in fire prevention. He said that he had addressed 50,000 school children in one year, and in another campaign 23,000 in one week, so that he had a varied experience. He showed the importance of attracting their interest, illustrating the talks with simple stories, using object lessons and pictures wherever possible. He gave a number of his stories and illustrations, but said that each speaker must suit his talk to his audience and his own personality. Mr. Gray, Ohio State agent of the North British, recalled his experience in addressing high school children and held that much more was to be gained in the lower grades than in the higher ones.

Benjamin Auerbach, secretary of the Western Insurance Bureau, and a member of the committee on publicity and education, declared the interest of those organizations in the work of the fire prevention associations. He said the companies generally approved the movement and wanted to see it extended and given loyal co-operation by the field men.

F. M. Griswold, general inspector for the Home of New York, led the discussion on the standardization of hydrant fittings and hose couplings. He showed its importance in making possible the co-operation of neighboring fire departments to fight large fires, reviewed the progress that had been made, and urged every association to follow the example set by Ohio in this matter. Rodney Wiley, president of the Ohio Fire Prevention Association, showed how it had secured the co-operation of the fire departments and assisted in the organization of several co-operative associations of fire chiefs. From Ohio the movement has extended to West Virginia and Kentucky, where similar associations have been formed. This was discussed by A. C. Speed and others.

J. C. McDonnell, chief of the Chicago Fire Prevention Bureau, told what the bureau was doing along the line of fire prevention. With 5 fire prevention engineers and 35 firemen detailed to the service, 140,000 inspections were made last year. This work has not only benefited the public, but has helped the fire department with its educational influence.

J. A. Bawden, president of the Indiana Fire Prevention Association, criticized the apathy of many fire insurance men in fire prevention work, but explained it by the fact that many of them had no business in the towns inspected. To meet the situation, the Indiana association has

Digitized by Google

selected a number of small towns with bad records, and sends to them a small committee made up of the field men having the largest interests in the town. The chairman is made responsible for the results. The committee is asked to hold a public meeting and is required to make talks in the public schools. If no public meeting is possible, the committee is urged to hold a round-table conference with the mayor, chief of fire department, city council, etc. Under this small committee system no member of the association is required to give more than two days a year to fire prevention work, but the chairman must give two days to each town—a preliminary visit to arrange for the inspection and the day of the inspection.

E. H. Smith, president of the Iowa Fire Prevention Association, said that its work during the past year had been largely devoted to the small towns, because of the need of explaining the new anti-discrimination law, and that excellent results had been secured.

W. J. Gilsdorf, representing the Tennessee and Kentucky associations, asked for suggestions as to the methods of enlisting the interest and co-operation of local agents. After fire prevention inspections had been held it was important to have the local agents follow up the work and secure the enactment of needed ordinances, etc. He said that their associations were giving out dwelling and chimney bulletins issued by the fire protection association at their meetings, and found the practice very helpful.

The secretary reported on the success of the observance of Fire Prevention Day, which was generally observed throughout the country this year. The discussion was continued by F. J. T. Stewart, of New York, chairman of the executive committee of the National Fire Protection Association, who explained the experiment of combining accident prevention with Fire Prevention Day and asked for suggestions or criticisms. The plan was criticized by Chairman Speed, who held that Fire Prevention Day should be kept separate and distinct from any other movement.

Mr. Daniel, of the engineering department of the Western Union, urged securing the co-operation of the fire chiefs in all fire prevention work, and that effort should be made to educate them along this line. He showed the good results which had been secured in Wisconsin, where regular inspections by the firemen are mandatory and the chiefs are under civil service.

E. J. Hollister, of the Bradstreet Mercantile Agency, urged that fire department inspections should go beyond the mere physical inspection, and should take into consideration the moral hazard, especially of newcomers and fly-by-night merchants.

M. L. Sears, of Kansas, told what the State association had accomplished in the way of placing fire prevention placards in the railway stations and post offices. W. S. Boyd, electrical inspector for the Western Union, advised that inspectors should be members of the National Fire Protection Association, should read its literature and be familiar with its standards, so as to be able to make proper recommendations.

Digitized by Google

Fifth Annual Safety Congress, National Safety Council. The Banquet at the Hotel Statler, Detroit, October 19

Digitized by Google

Dangers of Riveting Hammers

By J. P. Stone

New Jersey Zinc Company.

IN view of the great danger that attends the use of riveting hammers and the large number of accidents frequently occurring through the accidental discharge of the pistons of these hammers, the writer desires to describe a method devised and put into use on a steel frame structure that was to form a railway terminal station. Two men had been put out of commission, one had his head badly hurt, and another one had four ribs broken, when it was deemed worth while to look into the matter and devise a remedy for the trouble.

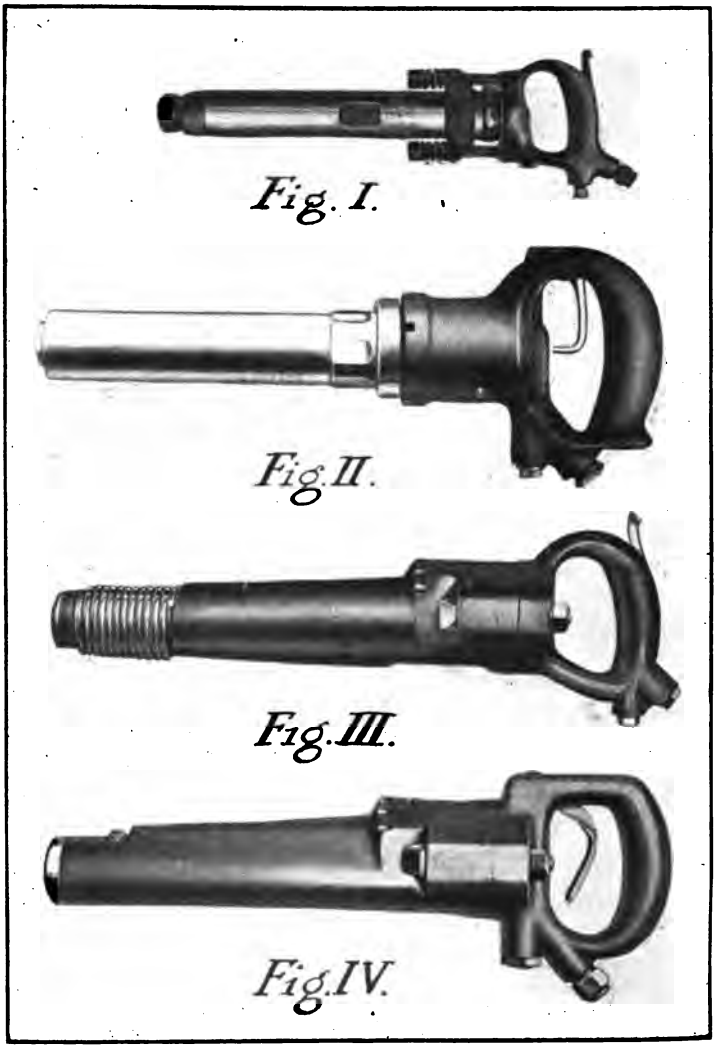


Fig. 1. Riveting Hammer with Outside Trigger and Small Piston.
Fig. 2. Riveting Hammer with Inside Trigger and Large Piston.
Fig. 3. Riveting Hammer with Outside Trigger and Spring Retained Rivet Set
Fig. 4. Riveting Hammer with Inside Trigger and Spring Retained Rivet Set

Two causes combine to make riveting hammers dangerous, one of them is inherent to bad design, the making of hammers with outside triggers, or triggers projecting outside of the handle. Hammers of this sort are very dangerous and have always been condemned by the writer. The other source of danger is due to carelesness—laying the hammers on the ground, floor, or any convenient place. Anything striking against the trigger sends the piston flying and a person in its path is likely to be hurt. Not only is the trigger likely to be struck by anyone passing, but a pull on the hose may cause the hammer to fall, thereby striking the trigger. In many other

Digitized by Google

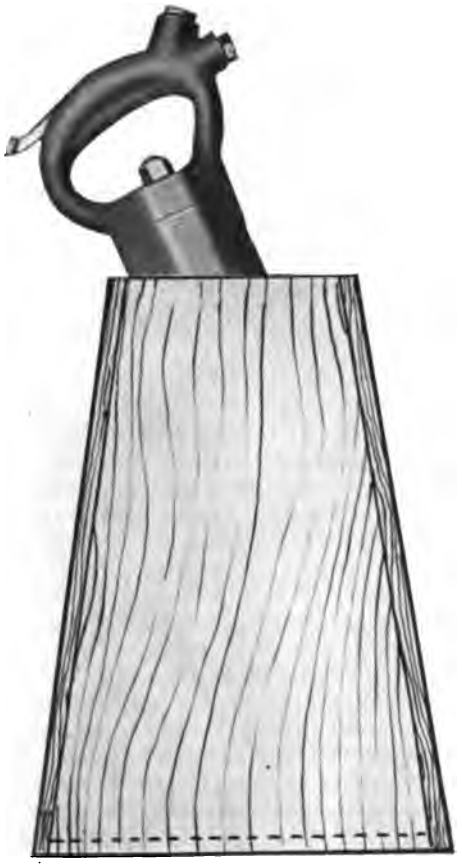


Fig. 5. Safety Box for Riveting Hammers When Not in Use

ways such tools may accidentally discharge their pistons. A number of accidents are on record where, in shops where structural iron work was put together, the men used the hammers to shoot the pistons at each other in "horse play."

Riveting hammers having inside triggers are much safer and practically free from accidental discharge, as it is very difficult to move the trigger except through design. Strange to say, this form has not been universally adopted. Aside from any element of danger, there is another bad point about all riveting hammers so built that the pistons can drop out. The pistons do frequently fall out and when they are replaced carry dirt and grit into the barrel. On bridge work, minehead frames and other elevated structures the loss of pistons is considerable. This not only occasions loss of time, but also introduces another source of trouble. The high price of pistons properly hardened and ground to exact size is sometimes responsible for the use of inferior pistons not supplied by the makers of the tools, and these often cause unsatisfactory operations of the hammers.

To overcome the difficulties mentioned the writer devised the boxes shown to place the hammers in when not in use. It is just as easy to put the hammer into its box as to lay it on the ground, on a convenient girder or other piece of work. These boxes were knocked together on the job, and were made larger at the bottom to prevent toppling over.

Many of the European riveting hammers are made with cylinders 1¼ to 1½ inches in diameter, with a short stroke. The nose of these hammers takes the standard snap and the pistons cannot come out. The hammers completely overcome the difficulties mentioned, and are very handy, as their short length makes them more convenient to use. They are amply powerful to drive the largest rivets; they are not subject to lost pistons and they obviate the delays that are so common with the hammers used in this country. Strange to say, hammers of this sort which combine many advantages over the other types have not found a ready application here. The old style long stroke of "I" bore, with all its inherent defects and personal danger, still continues to be the only type in use. This style of hammer in strokes of 9 inches and over has so much to condemn it that it surprises one to see it still in service. Fig. 1 shows a type of riveting hammer having outside trigger and a piston that can fall out. Fig. 2 shows a type of hammer having inside trigger and a piston larger than the nose of the hammer so that it cannot fall out. Fig. 3 shows a type of hammer having outside trigger, but with a powerful spring to retain the snap to prevent its falling off. Fig. 4 shows the same hammer, but with inside trigger.

Digitized by Google

The Accident Problem as It Concerns the General Public

By Frederick L. Hoffman, LL. D.

Statistician, Prudential Insurance Company of America.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

IT is conservatively estimated that the mortality from accidents of all kinds in the continental United States during 1916 will be approximately 75,000, in contrast to a corresponding estimate of 82,000 deaths caused by accidents during the year 1913. Of the estimated mortality of 75,000 during the year 1916, approximately 11,000 deaths will be caused by railways, 14,000 by falls, 8,500 by drowning, and 11,000 by vehicular accidents, including automobiles, but excluding steam railways.

Fatalities to passengers and contract persons carried on the steam railways of the United States, have decreased from an average of 17 per billion passenger-miles during 1905-09, which may be considered typical of the period preceding the modern "Safety First" movement, to 10.5 during 1910-14, and to 7.0 during 1915.

Street car accidents have decreased from 38 per million population in 1910 to 28 in 1915, a reduction of 32 per cent. Accidents caused by wagons, horses and vehicles other than railways and automobiles, have decreased from 43 per million in 1909 to 35 during 1915. Fatal automobile accidents in the United States registration area have increased steadily from 6.5 per million in 1907 to 23.9 in 1911, and 59.3 in 1915. Assuming a rate as low as 60 per million for 1916, the approximate number of deaths caused by automobiles throughout the year would be about 5,200, or 100 deaths a week. Uniform and more carefully considered traffic ordinances would aid materially in the effort to bring about a reduction in automobile casualties, which are, partly at least, attributable to the continued and obvious negligence and indifference on the part of the authorities.

The heavy mortality from falls, estimated for the United States at 14,000 deaths per annum, emphasizes the urgency of more thoughtful consideration of the accident hazard in domestic life. According to an authoritative statement, "owing to an active campaign against sidewalk hazards in Manhattan Borough," such casualties have been reduced from 68 in 1914 to 35 in 1915, or 48.5 per cent.

The annual loss due to drowning chiefly concerns young persons whose lives, aside from humane considerations, are of the highest potential economic value to the nation. Largely because of the increasing efficiency of the United States Coast Guard, and of the more extensive employment of trained private life savers along the beaches of the United States coast, a substantial saving in lives occurs each year, but not sufficient to materially reduce the mortality.

The fire hazard, aside from extensive conflagrations, which, of course, attract considerable public attention, continues to cause a large loss of life. The lessons taught by comparatively recent conflagration losses have apparently been productive of good results, but the nation-wide effort in behalf of fire prevention and control may be further improved and not permitted to fall back to the former condition of public indifference and neglect.

Accidental poisonings also have not been reduced to the extent required, and it is lamentable that there should be such a continued disregard of obvious safety precautions in the sale and the domestic handling of poisons. Accidental poisonings at present cause a much

Digitized by Google

larger loss of life than is generally assumed to be the case.

Electrical accidents are not as frequent as the ever-increasing use of electricity would seem to suggest. There apparently has been a measurable reduction, although the data are not quite conclusive. To a lesser extent this conclusion also applies to gas accidents, not only with reference to the general public but also to persons employed in the gas industry and in producer gas plants, chiefly in connection with the iron and steel industry.

These are but a few illustrations of the progress which is being made towards a measurable reduction in the loss of life throughout the United States, due to accidents of all kinds, and what has thus far been achieved in a comparatively short time is gratifying evidence of genuine progress and the attainment of higher social ideals.

"Safety First" in California Mines

By E. W. Bullard

Safety Engineer, San Francisco

THAT the "Safety First" movement has come to stay in the mines of California was conclusively shown at the second annual field meet for California miners held in Sacramento in September.

Nine of the largest mines of the State participated. This does not mean that they are the only mines that have first aid and mine rescue teams, as every mine in California now trains its men in first aid and all the larger mines have mine rescue teams; but the 9 mines felt that they had come to such a standard of efficiency that they were willing to pit themselves in a contest.

The efficiency, accuracy and gentleness shown in handling patients in the first aid problems was something to be proud of, as the longest time that any of the teams had been training was one year and a half. I have seen meets wherein the teams competing had been trained in first aid for a great many years, but I have never seen better handling than was done at this meet.

The Mine Rescue event was as efficiently carried through as the First Aid meet and, though fewer teams competed, the work done was just as good.

First aid is not the only "Safety First" movement on foot in California mines. The Safety Bear Club, which now boasts a membership of over 5,000 practical miners in this State alone,

Empire Mine. Winner of the Mine Rescue Contest. Carrying Patient Over Obstruction.

Digitized by Google

Argonaut Mine. Third Prize First Aid Contest. Broken Back.

does more to make "safety" miners than anything else. This club was inaugurated by Edwin Higgins, Chief Mine Inspector of the State Industrial Accident Commission. There are no dues, but each member is given a Safety Bear button and is asked to contribute suggestions to the monthly Safety Bear Letter, which is distributed to all members, and also to do personally all he can to make his workings safe and to influence his neighbor toward the side of safety. The response to this movement has been wonderful. One cannot now enter a mine in California without seeing on all sides Safety Bear buttons.

California is still young in the safety movement, but considering that the law only went into effect the first of the present year, the progress has been phenomenal, and California will soon be able to give some of the eastern States pointers in safety.

Pennsylvania's Safety Conference

THE Department of Labor and Industry of Pennsylvania, co-operating with the Engineers' Society of Pennsylvania, held its fourth annual Industrial Welfare and Efficiency Conference, November 21 to 23, in the State Capitol, Harrisburg.

Harry A. Mackey, chairman, Pennsylvania Workmen's Compensation Board, discussed "Nine Months of the Workmen's Cmpensation Law in Pennsylvania."

Marcus A. Dow, general safety agent, New York Central Lines, delivered an address on the "Evils of Railroad Trespassing," and showed the motion picture, "The House That Jack Built."

Magnus W. Alexander, General Electric Company, talked on "Hiring and Firing—An Economic Waste."

George T. Fonda, safety engineer, Bethlehem Steel Company, addressed the conference on "The Employer's Duty Towards Accident Prevention."

Vincent Colelli, interpreter, Pennsylvania Railroad Company, told "How to Reach the Non-English Speaking Workmen."

Commissioner Lewis T. Bryant, New Jersey Department of Labor, discussed "'Fire Prevention—How New Jersey Solves the Problem."

Other prominent speakers addressed the meetings.

Digitized by Google

Study of Accidents in 1915 in Cement Industry

Bureau of Accident Prevention, Portland Cement Association, Chicago, Ill.

[Extracts from a pamphlet prepared by Robert Brinton Hill, manager of the Bureau of Accident Prevention of the Portland Cement Association of Chicago.]

(*Concluded from October number.*)

THE majority of the causes shown are only too familiar, but the last tabulated under causes of fatalities is unusual. It seems that the unfortunate victim entered a hopper containing raw material and feeding a kiln, to break up a choke which was preventing proper feeding. Upon entering the hopper, he made use of a rope for his own protection, which was held by a fellow workman at the top of the hopper. Having completed his work, he cast aside the rope and started to climb out of the container. When just about at the top of the hopper, he was overcome by gas and the inhalation of dust and fell back into the tank. His companion became frightened and ran for help. After having removed the workman in question from the hopper, he was given artificial respiration, to which he responded, but nevertheless he died some few days later as a result of the accident.

From this summary it will be noticed that the commonest causes of accidents, according to this classification, are falling objects, flying material, and the breaking or slipping of machines, parts, or objects. There is a noticeable increase in the number of accidents charged against "Sharp Edges or Points." These accidents include injuries sustained by the handling of material, such as cuts from jagged stone or sheet metal, nail injuries and the like. There is a marked decrease shown in 1915 under the heading "Caught Between Parts." It is possible that this is explained by the fact that much progress on the work of the mechanical safeguarding of plants has been made.

Another table shows the causes of accidents largely by devices and materials, has been prepared in the same form as was employed in the 1914 study. The only change is that the figures under the detailed headings for previous years have been omitted. A chart presents the percentage of the total number of accidents reported during 1915 charged to the seven general divisions. "Miscellaneous Small Objects" were responsible for 50 per cent of the accidents, while "General Machinery" has 17.9 per cent of the accidents charged against it. "Hand Tools and Appliances" were responsible for 15 per cent and the remaining divisions for the smaller values.

In the following summary the figures for three years according to this classification are shown:

	Number of Accidents			Number of Accidents Per Million Bbls. Produced		
	1913	1914	1915	1913	1914	1915
Hand tools and appliances	451	515	595	8.6	10.2	9.7
General machinery	778	810	709	14.8	16.0	11.6
Electrical apparatus	92	92	59	1.8	1.8	0.9
Rolling stock	295	306	318	5.6	6.0	5.2
Stationary objects	248	225	205	4.7	4.5	3.4
Miscellaneous small objects	1,265	1.715	1,983	24.1	33.9	32.4
Miscellaneous general	163	123	98	3.1	2.4	1.6
Totals	3,292	3,786	3,967	62.7	74.8	64.8

Digitized by Google

Another chart, self explanatory, shows over 65 per cent of the accidents reported to be minor injuries, while slightly over 15 per cent were severe. Temporary eye injuries were responsible for 11 per cent of the total number of accidents, and there is no doubt but that the great majority of these eye injuries could be prevented through the obligatory use of proper goggles in those departments where such accidents occur most frequently. 93 such injuries occurred in the "Machine Shop," 68 in "Packing and Shipping" and 50 in the "Quarry." These three departments are the worst offenders in this particular. Those eye injuries occurring in the "Machine Shop" are in the main due to chipping, grinding, and machining or turning parts. If there is any time when goggles should be worn, it is while employes are engaged in such operations. The majority of the eye injuries in the "Packing and Shipping" department occur to men operating packing machines. Quite often there are holes in the sacks through which cement spurts while the bags are being filled and, regardless of the good condition of the sacks and the proper operation of the machinery, there is the ever present hazard of flying cement. The use of goggles by the packers would undoubtedly decrease the number of eye injuries occurring.

Eye injuries sustained in the quarry are generally caused by flying bits of rock. Where workers are breaking stone by hand, if other workmen are near they should be protected by screens which will prevent the flying of small particles. The employes breaking rock should, themselves, wear goggles. These accidents are of importance, as will be appreciated from the fact that in the last three years 3,752 days have been lost on account of them. This figure is equivalent to more than ten years lost.

Breaks or fractures, while responsible for but 4.1 per cent of the number of accidents reported, were responsible for over 6,000 days lost.

Table No. 5 gives the distribution of accidents by week days, together with the days lost chargeable on account of these accidents. Chart No. 5 shows this distribution for the past three years. The accident frequency is practically the same for the six usual working days of the week. The values for the various days and for all three years are quite similar with the exception of the drop in the 1913 line for Thursday. In 1913 the greatest number of accidents occurred on Friday. In 1914 the greatest number occurred on Thursday, while the figures for 1915 show the greatest number of accidents to have occurred on Wednesday.

A distribution of fatalities for 1915 according to the days of the week is as follows:

Sunday	2
Monday	8
Tuesday	7
Wednesday	4
Thursday	3
Friday	8
Saturday	3
	35

This distribution gives the greatest number of fatalities occurring on any single day of the week as 8 for Monday and also on Friday. These days are charged with the greatest percentages of the total time lost on account of accidents for 1915.

Another table shows the accident distribution according to the time lost charged. Under the totals for less than 15 days, a considerable drop is shown by 1915 as compared with 1914 in both the number of accidents per million barrels produced and the days lost per million barrels produced. The first division in this table comprises those accidents which, in a majority of the states, would be non-compensable on account of the generally prescribed waiting period of two weeks, which is found in the greater number of State compensation laws now effective. In the second division of the table, comprising accidents on which 15 to 25 days and up were lost, the fatality charge of 9,000 days plays an important part.

Referring to the columns based on per million barrels produced, a reduction of practically 50 per cent is shown for 1915 as compared with 1914 on the days lost on accidents causing a disability of more

Digitized by Google

than 14 days, and a reduction of practically 18 per cent in the number of such accidents per million barrels produced.

Referring to those accidents under "Did not return to work," it is gratifying to notice a drop from 1.7 accidents per million barrels produced in 1914 to 1.0 in 1915. For years little thought has been given to the tremendous waste of turnover in manufacturing plants. Every workman that leaves the employ of any company causes a loss to that company. A new man must be hired and broken in to fill his place. This costs money and the fewer men who fail to return to work after having sustained an injury there are, the better for the industry at large. Compared to 1913, this figure shows a reduction of approximately 60 per cent.

A chart is presented showing the distribution of accidents according to the days lost on account of them for the three years during which statistics have been gathered. The lines for the three years, while closely paralleling, show conditions in 1915 with reference to the accident severity to be better than in either of the previous years.

Another table shows the length of time the injured workmen were at work before the accidents occurred. In the total column, figures for three years are shown. In 1915 the greatest number of accidents occurred to those who had been at work 4 hours, the next value in importance being for those at work 3 hours. The 1914 figures show more accidents to have occurred to employes having been at work 2 and 3 hours, while 1913 figures give 3 and 4 hours as having the high values.

Another table which shows the distribution of accidents according to the hours of the day during which they occurred, is this year presented on an hourly basis. In conjunction with this table, a chart is presented, the solid line giving the accident distribution for 1915 and the dotted line the same information for 1913. It will be noticed that the lines for the two years very nearly parallel each other for practically all of the divisions shown on the chart. In both years the greatest number of accidents occurred between 9 and 10 in the morning and between 2 and 3 in the afternoon. The drop at the points 11 to 12 and 12 to 1 is accounted for by the lunch hour. The small number of accidents occurring between the hours of 6 p. m. and 6 a. m. is due to the decreased working force in the mills at night and to the fact that there is comparatively little quarry operation carried on at night. When it is remembered that the quarry employs over 20 per cent of the workers in the industry, this conclusion is justified. After glancing at the chart, it might be said that accidents are consistent in their occurence as far as their distribution throughout the day.

Another table shows the length of time the injured employes had been engaged at their particular operations before the occurrence of the accidents. In 1915 workers employed 4 weeks or less sustained 792 accidents, which is in excess of any other similar class shown by the table. This clearly indicates the importance of the proper education of new employes before allowing them to take up their duties. The hiring of new men is costly at best, and if new workers are not properly instructed in the performance of their duties, the probability of accident during the early periods of their employment is greatly increased.

The value of another table, showing the nationality of injured employes for 1915, has been considerably enhanced through the addition of a column giving the number of employes of the various nationalities represented, which permitted of the addition of columns showing the number of accidents per employe and the days lost per employe. Figures for the previous years are omitted.

Of those nationalities having 100 or more accidents charged to their representatives, we find that as regards accident frequency they stand in the following order:

Nationality	Acc. per Emp.
German	.583
Austrian	.395
Slav	.365
Mexican	.335
Hungarian	.228
American	.184
Italian	.154

Digitized by Google

Rated according to accident severity, the same nationalities appear in the following order:

Nationality	Days Lost per Emp.
German	57.7
Austrian	44.6
Italian	31.6
Mexican	31.1
Slav	30.6
Hungarian	23.3
American	7.5

In the above list the Americans have the lowest number of days lost per employe. This can be ascribed to their cleanliness as a race and their generally prevalent better mode of living.

Fatal accidents suffered by the various nationalities are as follows:

Nationality	Deaths	No. of Emp.	Deaths per 100 Emp.
American	6	8,455	.07
Austrian	6	1,291	.46
German	2	329	.60
Greek	1	603	.17
Hungarian	3	1,244	.24
Italian	8	2,391	.33
Mexican	1	328	.30
Portuguese	1	108	.93
Roumanian	1	212	.47
Russian	1	556	.18
Slav	3	986	.30
Syrian	2	not listed separately	

Another table gives the distribution of accidents according to age groups. These results are also platted on a chart. The chart shows a decrease in accidents occurring to employes under 22 years of age and an increase in employes between the ages of 30 and 50. From the table it will be noticed that for those divisions having more than 100 accidents charged to them, the lowest average days lost is for employes from 30 to 39 years of age, the highest being for employes between the ages of 40 and 49. The figure 750.7 given as the average days lost on accidents occurring to those 14 or 15 years of age is accounted for by the fact that though but 12 accidents were charged to this division, one of these was a fatality. Fatalities suffered by the various age groups for 1915 are distributed as follows:

14 to 15	1	22 to 24	6
16 to 17	0	25 to 29	7
18 to 19	1	30 to 39	5
20 to 21	3	40 to 49	8
50 to 59	2		
60 and over	1		
Not given	1		
Total	35		

Another table shows whether the injured's immediate superiors spoke the same language. Figures are given for all three years. The large increase in the second item, "Foreman Speaks, Others Not Given," is accounted for by the fact that in many cases the foreman is the workman's immediate superior, gangs being so small as not to require gang bosses under the foremen. In view of the increase of the total number of accidents reported, the reduction shown by the 1915 figures for "Foreman and Gang Boss Do Not Speak" is appreciable. This is also true of the following item: "Foreman Does Not, Others Not Given." It is of prime importance that men in charge of gangs be able to converse fluently with the men under them, and it would be a good plan if this was given consideration in the organization of gangs.

Another table shows the knowledge of English of the injured workman. In comparing the figures for the three years, an increase in the number of accidents is noticed in those who speak good English with a decrease in the number of days lost. The average days lost per accident shows those who speak good English to have the lowest figure. This is to be expected as the injured workers appearing in this class are a higher grade of workmen.

Fatalities according to the knowledge of English for the past three years are distributed as follows:

	1913	1914	1915
Speak good English	21	29	13
Speak little English	16	21	14
Speak no English	4	8	8
Not given	0	1	0

Another table shows that married men suffered 67 per cent of the total number of accidents occurring during 1915 and that 63 per cent of the total time lost is chargeable to them. The distribution of fatalities for this classification is as follows:

Digitized by Google

	1913	1914	1915
Married	21	33	22
Single	20	25	13
Not given	0	1	0

Another table classifies accidents according to the nature of the injury and medical treatment received by the individual case. Figures for three years are presented.

Out of 2,610 minor injuries occurring in 1915, only 80 are reported as having received no treatment at all. 1,179 received first aid and 938 received both first aid and a doctor's services. 386 received no first aid, but were treated by a doctor. The high percentage of the number of minor accidents receiving first aid indicates the increased use of first aid treatment in the plants of our member companies. With reference to the 80 minor accidents which received no treatment at all, it is a significant fact that the total number of days lost on these accidents was but 156, which is an average of days lost for each accident of slightly less than 2. Of 437 temporary eye injuries for 1915, only 6 are reported as having received no medical attention, while 375 had the attention of a doctor.

Of 609 severe cuts, bruises, burns, etc., but 11 were reported as having no treatment at all. 371 received first aid treatment, while 562 of these injuries had the attention of a doctor. This shows that it is now common practice for our companies to look after their injured employes in seeing that they have adequate and proper medical attention, for injuries sustained by them while working in the service of their employer. The better care a company takes of its employes, the more efficient they are bound to be and a spirit of faithfulness and loyalty is obtained which makes for satisfaction of the workmen with their employment.

Under "Breaks or Fractures" in 1915, there were 165 accidents, of which but 2 were reported as having received no treatment at all. 99 received first aid treatment, while 152 cases were attended by doctors.

Of the 36 amputations recorded in 1915, 23 received first aid and 34 had the professional services of a doctor.

In considering the medical treatment accorded fatality cases, the time lapsing between the hour of the accident and the death of the injured must be taken into account. Of the 35 fatalities for 1915, 4 are reported as having received no medical treatment at all. These four were cases of instantaneous death. 29 death cases were attended by doctors.

ESTIMATE OF THE COST OF ACCIDENTS FOR THE YEAR 1915

In the 1914 study an effort was made to arrive at some satisfactory conclusion as to the estimated cost of the accidents reported for that year. The compensation figures were based upon certain standards, which were determined by arriving at an average value for the various clauses of compensation laws in effect which govern the awarding of compensation. The same scheme is employed this year and the compensation costs appearing in this study are based on the following specifications:

General

Injured men to be compensated for all injuries, irrespective of responsibility, unless willfully inflicted or the result of intoxication.

Waiting Period.

Compensation starting on the 15th day after injured leaves work.

Scale of Compensation.

I. Partial Disability.
50 per cent of loss of earning power.
Maximum period, 300 weeks.
Maximum amount, $3,000.
Maximum per week, $10.

II. Total Disability.
50 per cent of average weekly wages.
Maximum, $10; minimum, $5.00 weekly or full wages if less than $5.00 weekly.
Maximum period, 400 weeks.
Maximum amount to be paid, $4,000.

III. Death.
If no dependents, reasonable expenses of last sickness and burial—not to exceed $100.
Total dependents, 50 per cent of average weekly wages for a period not exceeding 300 weeks from date of injury.

Digitized by Google

Maximum, $10 per week.
To partial dependents, such percentage of above as amount contributed by deceased to such partial dependent bore to total wages of deceased.

Medical and Surgical Aid.
Employers must furnish reasonable medical and surgical aid and pay hospital expenses as required at time of injury and for as much as forty days following date of injury. Total amount not to exceed $150.

Average Wages—How Computed.
Average weekly wages to be 1/52 of average yearly earnings.
Yearly earnings to be 300 times the average daily wage.

Who Are Dependents.
Dependents limited to members of family of deceased as spouse, lineal descendants, ancestors, brothers or sisters.

Using the above as a basis, the approximate compensation cost of fatalities, and other accidents involving more than fourteen days lost, is estimated to be as follows:

FATALITIES

	Deaths	Average Weekly Wage	Compensation
Married	22	$11.20	$36,960
Single (no dependents)	12	.....	1,200
Single (with dependents)	1	$11.55	1,734
Compensation cost of deaths			$39,894

INJURIES OF MORE THAN 14 DAYS' DURATION

No. of Accidents	Days Lost	Average Days Lost	Average Weekly Wage	Compensation
664	21,374	32	$11.50	9,814
Total compensation cost				$49,708

OTHER COSTS INVOLVED

(a)	30,171 days lost at $1 per day	$30,171
(b)	25,000 days' medical attention at $1.50 per day	37,500
(c)	2,800 days' hospital treatment at $2.50 per day	7,000
(d)	Loss of output—cost of hiring men	25,000
(e)	Reporting 3,967 accidents at $3	11,901
Total estimated cost of accidents		$161,280

Accidents in 1914 according to the estimate appearing in the study of accidents for that year cost the Association's members $181,413. From the total estimate of $161,280 for 1915, the appreciable decrease in the cost of accidents, as compared with last year, is noticeable. Reducing these two totals to a per million barrels produced basis, accidents in 1915 cost $2,635 per million barrels produced as against a cost of $3,585 per million barrels produced in 1914. This shows a reduction of almost 26 per cent in the cost of accidents for 1915 as compared with the previous year. Surely this is ground for encouragement.

Increase In Automobile Fatalities

The monthly report of the National Highways Protective Association of accidents due to vehicular traffic shows that 69 persons were killed in the streets of New York City during September, 1916. Thirty-six of these were children under 16 years of age. Automobiles caused 53 of the fatalities, the largest number ever recorded for any one month.

For the nine months ending September 30, automobiles on the streets and highways of the State, including New York City, caused the death of 543 persons as compared with 476 during the same period of 1915.

In New Jersey, 171 persons were killed by automobiles as compared with 178 during the same time in 1915.

For the nine months of 1916, there were 65 fatalities at grade crossings in New York as compared with 77 in 1915. In New Jersey for the same period, 43 persons were killed at grade crossings as compared with 40 in 1915.

Digitized by Google

"The Man On The Job"

Prevention of Accidents By Education of Workmen, Methods of Management and Mechanical Safeguards

SAFETY ENGINEERING offers each month one First Prize of $10.00 *and one Second Prize of* $5.00 *for Articles relating to Industrial Accident Prevention. In case of a tie, the full amount of the prize will be paid to each tied contestant.*

No. 250 ALL INDUSTRIES—"A WORD TO THE WISE."—"Safety First" doesn't amount to much if just painted on the door. 'Tis about as good as a "cafe" with a sign and nothing more. You must get busy Mr. Man. Organize to prove it. Show some interest, *personal* I mean. That's the way to do it.

Some owners think that after stenciling "Safety First" promiscuously throughout their plants and arranging to have machine parts and other hazardous items guarded or removed, according to recommendations submitted by their own and other inspectors, that all they can do is done.

Then, after receiving the approval of their State and insurance companies, they sit back with a feeling of satisfaction. But the *real* safety man's work is never done.

To be sure, he should be given credit for any hazards removed, but the value of safeguards, signs and notices without some strong personal interest taken by the head of the firm to further the work is lessened considerably.

The manufacturer, busy with his production end and willing to do everything asked, can not often look after the details concurrent wtih the present safety work and must, therefore, leave this to his plant superintendent or mechanics. In doing this, however, he should not forget that his presence at meetings and a word of commendation now and then to the safety committee or some little reward to encourage the employes in co-operating with the safety committee, means much towards harmonizing the plant along safety lines.

No. 251 VARIOUS INDUSTRIES—ELEVATOR CHATTER.—We are all of us familiar enough with that indispensable, often much neglected, sometimes erratic and usually little appreciated "beast of burden" the elevator, to require any further introduction. Most of those who use it usually do so with the most childlike confidence and trust in its safety and reliability and very few realize, in committing themselves and their chattels to it, how many things may happen in the short journey to its destination.

We see accounts in the papers of elevators dropping and persons being killed or badly injured, of some one walking into an elevator shaft through a door carelessly left open, safety devices failing to operate at the crucial moment, carelessness of operators, etc., etc. All of these have become matters of, so to speak, common routine in the busy life of to-day, and the causes are usually so apparent to those entrusted with their investigation that, at this time, I intend to touch on some other points in connection with elevators.

What I do want to talk about, and undoubtedly many of the readers of SAFETY ENGINEERING have taken note of them, are some of the *little* things, some of the peculiarities, and some of the more or less odd ways in which *some* members of the elevator family are being used; things which are not always given their due and proper *blame* for the parts they sometimes play in accidents which probably would not have happened if this or that condition had been absent or eliminated.

An old engineer of much experience with all classes of elevators once remarked to me: "The more I know about the things the more afraid of them I am." To which sentiments I heartily subscribe in the sense that strange and often terrible things happen most unexpectedly. One never knows what will happen.

The passenger elevator, hydraulic or

Digitized by Google

electric, of the modern skyscraper, is usually the last word in the elevator builder's art and is a nearly perfect piece of furniture. Also it is generally given the best of care by competent mechanics. Accidents due to the usual causes are not very numerous in passenger elevators, considering their number. There is one feature, however, which many of them have in common with those in department stores, hotels and apartment buildings, etc., that is, the mirror or mirrors in the sides, or at the back of the car. Women have no monopoly of the desire to inspect and admire their persons or apparel, but the fact remains that accidents have happened, and others have been narrowly averted, when some female passenger would make a frantic dash toward the door just as it was being closed and the car started, after suddenly "coming out" of the temporary suspension of a sense of her whereabouts, caused by the ardent contemplation of, shall we say the mirror, or what was seen in it. Very few among us, male or female, will pass by, or stand close to a nice large mirror without taking a peep at ourselves in it. We simply cannot help it. We are just built that way, and there are so many chances for accidents due to this cause, no matter in what class of building, that it should be done away with.

Any elevator construction concern will tell us that it is "absolutely impossible" for an elevator of the electric push button control type to move unless the doors are all closed. Persons making this assertion are usually quite sincere and there is no doubt about its truth as far as it goes, and when everything is built and adjusted correctly. Nevertheless the casualty insurance companies are repeatedly called upon to investigate accidents, mostly fatal, caused by this kind of car which it was "impossible to start unless doors or gates were closed."

What is the trouble? Let us look a little closer. There is no doubt that there are many of these cars running with which very little trouble of this kind has been experienced, but they were usually built for that kind of service from the start and everything about the installation is sufficiently strong and rigid to withstand the more or less constant slamming and banging to which they are generally subjected. Also adjustments of the relation of latch to door contacts are well looked after.

Take for example, one of the so-called "better class" apartment buildings, 15 to 18 years old, having one or more of the lever type passenger elevators. Competition is keen, expenses must be cut down in some way and a friend at the club suggests that the lever control of the elevators be changed to the push button type and the operator can be laid off. So-and-So has done it and it is working finely. Bids are accordingly invited from the various construction or electrical concerns and the job awarded to the lowest bidder, often without regard to his qualifications in this line. The contacts are placed on the old, often all too flimsy, doors and wire enclosure work, which buckle and bend whenever doors are slammed. The janitor is ordered to look after it, and the thing goes merrily on. In a short time the doors and framework, from being whanged in every key, have warped and sprung out of shape, and there is not a floor from which the car can not be started with the door partly open. The whole thing seems to resolve itself into this idea: make the door latch hook on before closing the door contact.

In a 10-story apartment building a push button controlled freight elevator was installed some years ago. In the rear fence of the car was a door, situated abreast of a similar opening at each floor in the rear wall of the elevator shaft, connecting with ice boxes on the various floors, designed as a convenience for the iceman in filling the boxes. This worked without trouble for a while. One morning, just as the iceman was in the act of lifting a chunk of ice into a refrigerator on one of the upper floors, the groceryman came in and wanted to take ***his*** stuff up. He pressed the button, and car, iceman, ice and profanity all came down together. Part of the floor in the car was broken, which came near being the iceman's fate. The handy door in the back fence should have had a contact breaker as well as the entrance door. One was put on at once after this incident by the same concern that installed

Digitized by Google

the elevator. Everybody shook hands and agreed that they were "in luck" to get off so easily.

The inside of the hoistway of a push button elevator is no smoother or more free from projections than that of any other elevator, and with no operator to warn passengers to "face the door," there is more danger of some one's getting too far to the front, getting caught and hurt, than in cars where an operator is employed. In my opinion no push button elevator should be allowed to operate without being provided with a gate or door on the car in addition to the one on the shaft enclosure. It should be so arranged that the car could not be started when either one was open in the slightest degree. Also it would be well to have the main line potential switch on controller board arranged so as to cut in and out both sides of main circuit and thus act as an effective circuit breaker at all times. An installation in a local bank is provided with a double set of door contacts besides a special lifting magnate on the automatic latch. This arrangement has given entire satisfaction although somewhat more complicated.

The advent of the automobile has stirred up trouble for some of the old freight elevators, large enough to accommodate an automobile. Some surprise and also repair bills have been created by the various ailments they developed after beginning to carry autos. An old, staid freight elevator that has plugged along patiently year after year at its work of carrying ordinary freight of all kinds, suddenly begins to get its guides loose and wobbly, guide shoes have cracked or broken out pieces and the platform begins to show a decided slope towards one end and refuses to stay on an even keel. In other words it has carried a few autos or perhaps heavy trucks. It being impossible to lift them up bodily and deposit them in the center of the elevator platform, they must perforce be rolled on and the end of the platform first receiving the weight of the auto sags and buckles and groans under the uneven strain put on it, and of course, the guides and shoes, usually the lower ones, are jarred out of their old ruts and have things happen to them. The uneven strain usually lasts only a few seconds at a time, but quite long enough to do the mischief.

When this method of putting a load on an elevator (the chauffeur usually sits in and drives the car) is compared with, for instance, that of loading a safe of no greater weight than the auto truck, where usually the elevator operator handles his machine from the doorway, not caring to, nor being allowed to ride, if there is competent supervision. One somewhat familiar with the inner works finds himself wondering what will happen next in these strenuous times of—but what's the use of calling names?

Many of the elevators in garages and automobile houses, built for the purpose in later years, are well adapted to their work, many having two pairs of guides placed with due regard to the length of the platform and the strains they have to withstand. Some of the "carriage hoist" type have one hoisting cable in each corner, so as to divide the lift more equally between them; a somewhat doubtful remedy, to my way of thinking, making those at the entrance carry all the load at the moment of loading, besides requiring a more complicated arrangement of overhead sheaves, brackets and leads. There is room for improvement here.

Lastly, as long as I have my "hammer" swinging, I might as well have one more "knock" at another one of the tribe, to wit, the converted hand hoist elevator. This is always one of the rope hauled kind, fitted by the mechanical genius of the shop or factory with a power attachment whereby the back-breaking job of pulling the load by hand power is obviated. The power for this is usually taken from some convenient line or countershaft fitted to a home-made friction-belt and pulley or chain and sprocket drive. It generally does all its "inventor" intended it to do, hauls the load, but here the inspiration of the inventor is usually at an end. I have no quarrel with anybody's trying to make a machine do the work that hands formerly did so long as it is not a menace to the safety of life and limb. But in nine cases out of ten not the slightest thought is given to any such matters as an automatic stop device of any kind at the

Digitized by Google

limits of travel, nor is the operating device of an accessible or reliable kind, often being entirely lacking in safety devices. The hoisting cables are seldom larger than ½-inch and often smaller, but no attention is paid to this. The car which is often of considerable size is loaded more heavily than is consistent with good judgment and safety. The makers of such elevators evidently do not take into consideration the difference in mode of operation.

These are some of the things regarding "Friend Elevator" which have been foremost in mind of late, and I am certain that a number of the readers of this magazine have had experiences and noted points along these lines which would be both of interest and profit for the rest of us to share. Much valuable information is tucked away in the heads of a lot of men of experience all over the country, the problem being to dig it out, as such information is not found in books. The ones who know are usually better listeners than talkers.

❦ ❦ ❦

No. 252 ALL INDUSTRIES—THE FOREMAN'S PART IN THE SAFETY MOVEMENT.—There are three good reasons why a factory foreman should participate in safety work earnestly and actively:

1. Because of its humanitarianism. "There is," according to Ida Tarbell, "nothing so valuable as the man. The stronger, the longer-lived, the happier, the more ambitious he is, the better for mankind. Injury and death are the fruits of ignorance, recklessness and greed. A death toll is no part of a properly managed industry."

Loss of life and limb are not humanitarian by-products of industry. Nothing is so precious as a perfect body and health. The foreman should realize that the bodies and health of his men are of much more importance than the machinery they operate; that the flesh and blood of the "boys" is worth more than the castings and steel they handle. The foreman is in a special sense "his brother's keeper." He is placed not only to look after the upkeep and care of machine tools, but, in all better plants, also to guard the welfare of his human tools. A broken shaft or defective casting can be replaced, but a leg or arm, an eye or a life lost is lost forever and no compensation ever fully compensates. Just as a father looks after the welfare of his dependents so should department heads look after those in their charge. Let your "boys" realize that you are their "old man"; that the "old man" is genuinely interested in their welfare and is looking after them for their own good and the foreman's task has been made much easier, and a long step taken toward improving the quality of the factory organization. No foreman should want his sleep or rest disturbed by thoughts of accidents to his men that could have been prevented.

Among the many splendid ideas worked out by the late Frederick Taylor, we especially like his stand that a foreman should be a teacher rather than a driver, at all times ready to show his men how to properly perform their tasks. It is the business of every foreman to accept raw materials and turn out a finished product. Just so, department heads have to accept the raw material in labor and are expected to develop the finished labor product, a competent, careful workman. The foreman has no certain means of knowing when he puts a new man to work if he is efficient or careless and a menace to his fellow workers. It is, however, expected of every foreman to take such a man in hand and teach him not only the technical side of his task, but also that carelessness will not be tolerated any more than defective output. Foremen should always remember that they are directly responsible for the recklessness of their men.

2. Because of its broad economy. We know that several hundred million dollars is wasted in this country annually by preventable accidents. That loss eventually comes out of the ultimate consumers, you and me. This cost is reflected in the price we pay for our beefsteaks, groceries and clothing, for our motor cars and gasoline. No one can less afford this than those who

Digitized by Google

through thoughtlessness and carelessness bring it upon themselves, the workmen. A thrifty man hates waste. To destroy a man's earning capacity by robbing him of his sight or his limbs is the worst possible kind of waste.

3. Because it is a good thing for the foreman and his employer. From a strictly business standpoint safety work pays. The efficient and intelligent foreman is measured not only by his ability to produce work satisfactorily as to quality and cost but also by his ability to build up an organization and eliminate accidents. The foreman is, therefore, financially interested. It is just as important to the employer to reduce accident costs as it is to reduce costs along any other line. We would go even further and say that it is more important to the employer to reduce accident costs than along other lines. The dollar saved through accident prevention is infinitely more valuable to the employer than the dollar made through sales. And a dollar lost through preventable accidents is doubly dear.

The reduction of accidents lowers the employers' insurance rate, but how much more valuable is the increased goodwill, the family spirit, the co-operation, the efficiency that follows where a consistent policy of carefulness towards one another is maintained. *Safety work pays.*

We believe Rudyard Kipling points out how this is best achieved:

"It ain't the guns nor armament, nor the funds that they can pay.
But the close co-operation that makes them win the day.
It ain't the individual, nor the army as a whole,
But the everlastin' team work of every bloomin' soul."

No. 253 ALL INDUSTRIES—PLAYING THE GAME OF "SAFETY FIRST."—All the world loves a winner when the contest has been fairly played. The local baseball team receives far greater enthusiasm and support when it is winning than when it is repeatedly losing. We praise the accomplishment of a difficult feat. Each one of us hails the skill and tenacity of purpose that "puts over" any great achievement. Things requiring the clear head, the watchful eye, the skillful hand, and the bulldog grip of determination, get our hearty commendation.

Said Abraham Lincoln, "I don't think much of the man who is not wiser today than he was yesterday." No truer words could be written of the "Safety First" game. If you would be a winner, each day must find you wiser, keener and more alert than the day before. It is a contest in which we match our determination to have no suffering from accidents to ourselves and fellow men against little acts of thoughtlessness and carelessness that bring these results.

Nor is the game ever ended. Each new day calls for a better score; new conditions surround us, and all of our faculties, the best that is in us, are challenged to increased effort. To have our work really well done, it must be safely done, and none of us wants any less than the best.

For your own sake—for the sake of the family at home, the wife and children, the mother or sister, play the game and play it well. Play it with the interest, the spirit, the enthusiasm that will make you *win*. It will take all your skill and ability to play it right!

Yesterday is gone—forget it.
Tomorrow is yet to come—plan for it.
Today is here—use it.

Comments by Members of the September and October Committees

The writer of 239 has enlightened every one on many different phases of industrial work. The mental picture that can be formed from his items is wonderful. I feel sure that his article is very correct and that it will start more than one person to look for the loopholes that have been outlined.

❦ ❦ ❦

My reasons for selecting 242 for first prize, are on account of the practicabil-

Digitized by Google

Prizes for September Articles

First Prize. No. 239. Benjamin Dexter Rhodes, Supervising Inspector, Northwestern District, General Accident, Fire & Life Assurance Corporation, Limited, Winona, Minn.

Second Prize. No. 238. William C. Mayer, Inspector, Workmen's Compensation Service Bureau, Portland, Maine.

Honorable Mention. A tie. Nos. 241 and 242. Earl J. Reeder, Safety Engineer, Michigan State Accident Fund, Lansing, Mich.; Charles T. Miley, Assistant Supervisor, Department of Labor, Safety & Welfare, The Carpenter Steel Company, Reading, Pa.

Another meritorious article was contributed by John H. Korner, Inspector, Ocean Accident & Guarantee Corporation, Buffalo, N. Y.

Prizes for October Articles

First Prize. No. 248. Corydon Chamberlin, Safety Inspector, American Smelting Company, Murray Plant, Murray, Utah.

Second Prize. No. 243. William E. Rhodes, Safety Inspector, General Accident, Fire & Life Assurance Corporation, Limited, Winona, Minn.

Honorable Mention. No. 247. Robert D. Young, Division Accident Investigator, Department of Labor & Industry, Bureau of Inspection, Harrisburg, Pa.

Other meritorious articles were contributed by Daniel J. Kennedy, Superintendent, Kennedy Valve Manufacturing Company, Elmira, N. Y.; William C. Kerber, Inspector, Fidelity & Deposit Company, New York City; George Schwessinger, Boiler, Elevator & Fly Wheel Inspector, New Orleans, La.; John S. Spicer, Chemical Engineer, Department of Labor & Industry, Harrisburg, Pa.

---

ity and adaptability of the suggestion. Pictures certainly convey the warning or message from the safety department to the workmen much more forcibly than words. I have noticed in our safety work, that the men are attracted to the bulletin boards by pictures, and when the pictures are local, a very keen interest is taken.

❦ ❦ ❦

No. 238 takes into account, first of all, the employer who must be made to see the advantages, in a comprehensive way, of "Safety First." It is usually difficult, if not impossible, to enlist the interest of employes—who after all are the ones most benefited by the movement—unless those in authority assume leadership. Guards and signs avail little unless the "Safety First" spirit prevails.

❦ ❦ ❦

In my opinion, No. 242's idea of the "little camera" is good and should prove a very effective help to show up conditions about a plant as well as to get the bad ones remedied.

❦ ❦ ❦

No. 238 touches the vital spot in the first and second paragraphs. No. 239 is an excellent article and also touches a spot that needs tuning up by education. But how is The Man on the Job to get the necessary education unless The Man Higher Up foots most of the bill—first, by giving him a chance to look about and see what others have done and, second, by paying the expense after the education.

❦ ❦ ❦

No. 239 proves all his points by facts.

❦ ❦ ❦

Every September contributor is entitled to credit. The part that should be played by The Man On The Job is clearly presented by the author of No. 239, which in my opinion merits first prize. No. 241 is well written and points out

Digitized by Google

the qualities required in the makeup of the successful inspector.

❦ ❦ ❦

No. 241, perhaps, contains more good suggestions that have not been dwelt on before, than any other September article. Among the comments on the merits of articles in the August contest is one containing a suggestion that seems to be worthy of consideration. The voter suggests that a "question and answer" department be opened in SAFETY ENGINEERING. His idea, no doubt, includes criticism and discussion. Perhaps it would be well, if the proposition is carried out, to limit the questions and discussions to articles appearing under the heading The Man On The Job, else publication of all that would be contributed would be too big an undertaking to consider.

❦ ❦ ❦

No. 243 is one of the best I have ever read as it sets forth, in the best of language, the best way to obtain good results from a safety campaign. The importance of the foreman in safety work is properly emphasized.

❦ ❦ ❦

No. 246, stating in a few words that The Man At The Top must "co-operate," tells the whole story.

❦ ❦ ❦

Article 248 points out why foremen so often fail to do the safety work in their departments for which they are held responsible. I am glad to state that I have overcome this fault with my foremen. I had several that were very stubborn along the line of responsibility, but by patient, courteous treatment, they have developed into careful safety men. I watched them at their duties, and whenever I saw them working under unsafe conditions, or doing dangerous stunts, I endeavored to show them how much better and easier it was to do the work in a safe way. I also watched their men and followed the same course with these —teaching them to do their work properly. I am glad to say that by perseverance I have won the men all over to the safety cause. Prior to this, some of them had already learned that they were in danger of losing prestige over careful men by their indifference, and were waking up to the fact that if they were to keep up to the highest mark of efficiency they must assume the responsibility. As a result, I am greatly pleased to note the interest with which they are taking hold of the work, for now instead of my having to call their attention to these matters, they are voluntarily looking after their men and asking my advice. So you can readily see how pleased I was to note the article, "The Foreman's Responsibility." After marking the article, I turned the magazine over to my men in the shop to read and receive their comments. They all agree with me that No. 248 is the best.

❦ ❦ ❦

No. 248 clearly sets forth basic principles as they must be applied practically to attain results.

❦ ❦ ❦

No. 248 has put the foreman's responsibility in such a clear and convincing manner that every foreman who has the privilege of reading the article will realize that safety is as much a part of his work as production.

❦ ❦ ❦

I believe, as No. 248 believes, that the foreman has more power to prevent industrial accidents than any other agency. He is authorized to compel safe installations and to see that safe practices are followed. Unless these two requisites are carried out other effort toward accident prevention falls flat.

❦ ❦ ❦

I think the best article is 248 for the following reasons: It deals with the person who has charge of the actual getting out of the work, who is supposed to be at all times on the job; it gives a practical illustration of actual conditions as I think they should be, viz., the foreman in charge of men—to the extent not only of getting out the work, but also the safety and welfare of the men—should have the picking of his men and discipline

Digitized by Google

them, if necessary, otherwise the foreman should not be held responsible for their safety.

❦ ❦ ❦

I consider 248 the best, for it appeals to me in another light. It says, "the superintendent expects every man to do a fair day's work." This is true, most men try to do a fair day's work, but whether it is the superintendent, general manager or the smallest boss they should not have a man in their employ that they do not put confidence in. If a man has any doubt as to whether a man is doing the right thing or not, he should look up his record of jobs, the time put in on them, and go out and look at the job and satisfy himself as to whether the man is doing right or not. A man cannot be doing something every second, and just at that time is when the superintendent is most likely to appear on the job, and some men jump at the conclusion that the man is idle all the time.

❦ ❦ ❦

No. 247 appeals to me as a most interesting article of The Man On The Job. The employer must have firmly implanted on his mind the safety habit.

I much appreciate the prize for my contribution to the August number. Really feel quite chesty over it. The receipt of the check was my first knowledge, for I have been so occupied with my work that I had not read thoroughly the last magazine. This is poor business —not to take the time to read all of SAFETY ENGINEERING, for there is something in every number that is well worth while. As a talking point for your advertising man, which he probably does not need, I may say that my first look over is the advertising and the trade notices, being interested to see what comes out.—ADRIAN W. MCCOY, Department of Labor and Industry, Pennsylvania.

❦ ❦ ❦

I beg leave to acknowledge receipt of your favor enclosing check for $10 for the first prize for my article in The Man On The Job. It certainly gives me pleasure to have won this prize as it is the second time I have been asked to write and in both instances received this encouragement, which makes me feel that my articles are of some use to those interested in safety.—W. P. STRICKLAND, General Inspector, N. Y. & Queens Electric Light & Power Co.

"The Fight Against Fire"

Prizes for September Articles

First Prize. A tie. Nos. 112 *and* 113. *J. Verner, Linden, N. J., and Jacob Winkler, Inspector, Bureau of Fire Prevention, City of New York, Long Island City, N. Y.*

Second Prize. No. 115. *Samuel M. Rehfield, Lieutenant, Hook & Ladder Company No.* 129, *New York Fire Department, Corona, L. I., N. Y.*

Another meritorious article was contributed by F. W. Ransom, Special Agent, Providence-Washington Insurance Company, Columbus, Ohio.

Comments by Members of the Committee

Unquestionably 115 treats of one of the most important factors controlling the fire waste, and the illustrations of defects in buildings and the cure for them are logical.

❦ ❦ ❦

Article 112 shows a general knowledge of existing conditions. It seems to me the suggestion for safeguarding the safeguards is important. Often the letter of the law is or seems to be complied with, while the danger is not really lessened. The article is easily understood and the method is so practical and applicable to so many cases that it will be of great value in fire prevention in general.

Digitized by Google

Literature of Safety

ACCIDENT PREVENTION, INDUSTRIAL HYGIENE, OCCUPATIONAL DISEASES, ETC.

Health Insurance in Wisconsin. Amer. Journal of Pub. Health, Oct., 1916.

"Safety First" for Munition Mills. Amer. Journal of Public Health, Oct., 1916.

Pennsylvania's Fatality Record. Amer. Journal of Public Health, Oct., 1916.

The West Virginia Flood of Aug. 9, 1916, and the Health Relief Measures. By Mayo Tolman, Dir. & Ch. Engr., Div. of Sanitary Engineering, W. Va. State Dept. of Health. Amer. Journal of Public Health, Oct., 1916.

A Plan for Education in Industrial Hygiene and the Avoidance of Occupational Complaints. By Dr. J. W. Schereschewsky, U. S. Pub. Health Service. Amer. Journal of Pub. Health, Oct., 1916.

What Ohio Is Doing to Conserve Life in the Industries. By Victor T. Noonan, Dir. of Safety, Ohio Indus. Com. Amer. Journal of Public Health, Oct., 1916.

Monthly Review of U. S. Bureau of Labor Statistics, Oct., 1916. U. S. Dept. of Labor, Bureau of Labor Statistics.

Monthly Statement of Coal-Mine Fatalities in the U. S., Aug., 1916. Containing also a list of permissible explosives, lamps and motors, tested prior to Sept. 30, 1916. Compiled by Albert H. Fay, U. S. Bureau of Mines, Washington, D. C.

The Safety Inspector in the Bakery. Travelers Standard, Sept., 1916.

Monthly Statement of Coal-Mine Fatalities in U. S. July, 1916. Also list of permissible explosives, lamps and motors; tested prior to Aug. 31, 1916. Compiled by Albert H. Fay, U. S. Bureau of Mines.

Safe Practices—Ladders. "Being an orderly presentation in loose-leaf form of accident hazards and the best practices for their elimination." National Safety Council, Chicago.

Inspector's Recommendations. The Travelers Standard, Oct., 1916.

Rescue and Recovery Operations in Mines After Fires and Explosions. By James W. Paul and H. M. Wolflin. U. S. Bureau of Mines.

Preventing Injuries Due to Power Saws by Their Proper Use and Care. By James L. Gernon. Bulletin of the New York State Industrial Commission. Sept., 1916.

Industrial Hygiene and Health Insurance. By John B. Andrews. Amer. Journal of Public Health. Sept., 1916.

Individual Caution the Most Effective Accident Preventive. By Magnus W. Alexander. Economic World, Sept., 1916.

Eliminating Fatigue in Factories. By Frank B. Gilbreth. Industrial Canada, Sept., 1916.

Safety in Rolling Mill Operations. By Charles R. Hook, American Rolling Mill Co., Middletown, Ohio. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Safety in Coke Oven Operations. By K. M. Burr, Illinois Steel Co., Gary, Ind. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Electric Hazards. By D. M. Petty, Bethlehem Steel Co., South Bethlehem, Pa. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Marine Safety Regulations. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Standardized Federal and State Safety Regulation. By E. B. Rosa, Bureau of Standards, Dept. of Commerce, Washington, D. C. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

The Accident Problem as It Concerns the General Public. By Frederick L. Hoffman, Prudential Life Insurance Co., Newark, N. J. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

The Doctor's Work in a Benefit Association. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Interesting the Manufacturer in Accident Prevention Work. By F. D. Campau, Furniture Manufacturers' Association, Grand Rapids, Mich. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

How to Organize a Saw Mill for Safety. By F. A. Barker, Lumberman's Mutual Casualty Co., Chicago. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Possibilities of Preventing Accidents in Logging Camps Through Educational Means. By J. J. Lingle, Westboro Lumber Co., Westboro, Wis. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Safeguarding the Most Hazardous Machines in Woodworking Plants. By Henry Burr, T. H. Mastin & Co., Kansas City, Mo. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Safe Practices in Lumber Yards. By B. C. Christy, International Harvester Co., Chicago. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Safety Committee Work in Paper Mills. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Safety in the Plants of the Ontario Pulp and Paper Manufacturers' Plants. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Maintaining Interest in Safety Bulletin Boards. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Relation of the Eight Hour Day to Safety. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Health and Surgical Problems of the Paper Industry. Proceedings of fifth annual con-

Digitized by Google

gress, National Safety Council. Oct. 17-20.

Public Safety Work of Public Service Companies. By H. A. Bullock, Brooklyn Rapid Transit Co., Brooklyn, N. Y. Proceedings of fifth anual congress, National Safety Council. Oct. 17-20.

Street Traffic Regulations as Related to Public Safety. By William P. Eno, Saugatuck, Conn. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Ideal Organization for Public Safety in a Community. By Robert W. Campbell, Illinois Steel Co., Chicago. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Public Safety Education in the Public Schools. By R. B. Morley, Ontario Safety League, Toronto, Ont. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Practical Aspects of Public Safety Work. By Dr. William Burgess, Public Safety Commission of Chicago and Cook County, Ill., Chicago. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Relationship of Health to Industry. By Dr. W. A. Evans, Chicago Tribune, Chicago. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Medical Supervision of Workmen. By Dr. Harry E. Mock, Sears, Roebuck & Co., Chicago. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Reduction of Health Hazards. By Dr. Francis D. Patterson, Pa., Dept. of Labor & Industry, Harrisburg, Pa. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Maintaining Interest in Accident Prevention. General Round Table Discussion. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20, 1916.

Light and Its Relation to Danger Signs. By Sidney W. Ashe, General Electric Co., Pittsfield, Mass. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Oxygen Mine Rescue Apparatus. By E. Steidle. Paper presented at annual meeting of Internat. Assoc. of Fire Engineers, Aug. 29-Sept. 1, 1916. Fire Engineer, Sept., 1916.

Health Problems in the Chemical Industry. By Dr. George M. Price, Joint Board of Sanitary Control, New York City. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

The Goggle Problem in the Chemical Industry. J. R. de la Torre Bueno, General Chemical Co., New York City. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Health Conservation at Steel Mills. By J. A. Watkins. Technical Paper 102, U. S. Bureau of Mines.

Safe Practices at Blast Furnaces. A Manual for Foremen and Men. By Frederick H. Willcox. Technical Paper 136. U. S. Bureau of Mines.

The Statistical Basis for Assessments and Benefits. By J. M. Eaton, Cadillac Motor Car Co., Detroit, Mich. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Standardizing Accident Records. By Royal Meeker, U. S. Bureau of Labor, Washington, D. C. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

The Essential Feature of Organizing Benefit Associations. By W. L. Chandler, Dodge Manufacturing Co., Mishawaka, Ind. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

The Mutual Value to Employer and Employe of a Benefit Association. By J. N. Redfern, Chicago, Burlington & Quincy R. R. Co., Chicago. Proceedings of fifth anual congress, National Safety Council. Oct. 17-20.

Electrical Hazards (Cement Industry). By R. J. Young, Portland Cement Association, Chicago. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Safe Practices in Quarry and Mill (Cement Industry). Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

How to Make Safety Committee Meetings Interesting. By W. C. Wilson, Del., Lackawanna & Western Ry. Co., New York. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Elevators—How Used and How to Avoid Accidents While Being Used. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Paper Mill Ventilation. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Various Types of Calender Guards. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

What Has Been Accomplished in Cement Companies in Safety Work. By Robert Brinton Hill, Portland Cement Association, Chicago. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Warnings at Interurban and Obstructed Crossings. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Safety Devices on Electric Street and Interurban Cars. By Charles H. Cross, Milwaukee Electric Ry & Light Co., Milwaukee, Wis. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

The Application of the National Electric Safety Code to Electric Railway Construction and Operation. By W. J. Canada, Bureau of Standards, Washington, D. C. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

The Safety Work of the Ludlow Manufacturing Associates. By B. B. Fogler, Ludlow Manufacturing Associates, Ludlow, Mass. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Safety in Southern Cotton Mills. By G. D. Bragdon, General Accident, Fire & Life Assurance Co., Philadelphia. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

How Shall Injuries Resulting from Train

Digitized by Google

Operation Other Than Collisions and Derailments Be Prevented? By F. M. Metcalfe, Northern Pacific Ry. Co., St. Paul, Minn. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Shop Accidents: (a) What Has Been Accomplished in Their Reduction? (b) How Was It Done and What More Can Be Accomplished? By B. C. Winston, Wabash Ry., St. Louis, Mo. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

The Most Frequent Causes of Injury to Track and Bridgemen and the Best Way to Eliminate These Causes. By Charles T. Banks, Erie R. R. Co., New York City. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Hernia. By Dr. James Burry, Illinois Steel Co., Chicago. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Dental Work in the Industries. By Dr. Lee K. Frankel, Metropolitan Life Insurance Co., New York City. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Industrial Hospitals and Dispensaries. By Dr. R. C. Cabot, Boston, Mass. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Employment, Medical Supervision and Safety. L. A. Phelps, The Avery Co., Peoria, Ill. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

The Company Doctor. By Dean Samuel S. Marquis, Ford Motor Co., Detroit, Mich. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Hazards of Power House and Car Barns and Their Remedies. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Methods of Instructing New Motormen in Their Duties. By H. B. Adams, Aurora, Elgin & Chicago Ry., Aurora, Ill. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Strains, Sprains and Bruises. By Sydney W. Ashe, General Electric Co., Pittsfield, Mass. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Employment Problem as Related to Safety. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Fume Poisoning from Nitric and Mixed Acids. L. A. De Blois, E. I. du Pont de Nemours & Co., Wilmington, Del. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Care of Workmen Employed in the Manufacture of Aniline and Benzol Products. By A. B. Mitchell, Benzol Products Co., Marcus Hook, Pa. Proceedings of fifth annual congress, National Safety Council, Oct. 17-20.

Dangers Other Than Accidents in the Manufacture of Explosives. By Dr. Alice Hamilton, U. S. Bureau of Labor Statistics, Chicago. National Chemical Convention, New York City. Sept. 29, 1916.

Poisoning by Aniline and Other Coal-Tar Products: a New Occupational Malady. By George P. Adamson, Baker & Adamson Chemical Co., Easton, Pa. National Chemical Convention, New York City. Sept. 29, 1916.

Bureau of Mines, Studies on Occupational Diseases. By Dr. W. A. Lynott, U. S. Bureau of Mines, Washington, D. C. National Chemical Convention, New York City. Sept. 29, 1916.

Some Abnormal Effects on Workmen Engaged in the Manufacture of Port Oxford Cedar Lumber. By Prof. H. K. Benson, University of Washington, Seattle, Wash. National Chemical Convention, New York City. Sept. 29, 1916.

The Occupational Hazard in the Chemical Industry: the Need for Prophylaxis. By Dr. J. W. Schereschewsky, U. S. Public Health Service, Pittsburgh, Pa. National Chemical Convention, New York City. Sept. 29, 1916.

Standards of Industrial Hygiene. By Dr. J. W. Schereschewsky, U. S. Public Health Service, Pittsburgh, Pa. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Crane and Chain Practices. By F. H. Elam, American Steel Foundries, Chicago, Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Eye Protection. By F. W. Shepard, American Cast Iron Pipe Co., Birmingham, Ala. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Alcohol vs. Safety. By Dr. H. P. Hourigan, Larkin Co., Buffalo, N. Y. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Foundry Sanitation. By J. F. Alexander, Metal Trades Safety Association, Toronto, Ont. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Safety in Blast Furnace Operation. By F. H. Wilcox, U. S. Bureau of Mines, Pittsburgh, Pa. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Progress of Safety in Iron and Steel Industry. By Dr. Lucian W. Chaney, U. S. Dept. of Labor. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20

Safety in Bessemer Operations. By J. H. Ayres, National Tube Co., McKeesport, Pa. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Accident Statistics. By Albert H. Fay, U. S. Bureau of Mines. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Safety in Open Hearth Operations. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Qualifications of a Mine Foreman. By J. W. Paul, Pittsburgh, Pa. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Mine Safety Signs and Signals. By D. J. Parker and Edwin Steidle, U. S. Bureau of Mines. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Workmen's Compensation and Its Effect on

Digitized by Google

Safety in Mining. By H. M. Wilson, Associated Companies, Pittsburgh, Pa. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Mine Accidents and Their Prevention. By H. G. Davis, Del., Lackawanna & Western R. R., Kingston, Pa. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Relation of Workmen's Compensation Laws to Accident Prevention Movement. By Dr. F. D. Patterson, Pa. Dept. of Labor & Industry, Harrisburg. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Station Safeguarding. By Charles Penrose, Philadelphia Electric Co., Philadelphia. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Underground Sanitation at the Mines. By W. A. Borchard, Austinville, Va. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Accident Prevention in the Commercial Department of a Large Gas Company. By C. W. Clabaugh, Omaha Gas Co., Omaha, Neb. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Safety from the Economic Standpoint. By B. Frank Day, Philadelphia Electric Co., Philadelphia. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Safety Wrinkles Around a Gas Works. By G. I. Vincent, Des Moines Gas Co., Des Moines, Ia. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

The American Railroad Passenger: (a) What the Railroads Have Done and Are Doing for His Safety. (b) What He Should Do for His Own Safety. By G. L. Wright, Chicago, St. Paul, Minneapolis & Omaha R. R., St. Paul, Minn. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

The Prevention of Accidents. By R. C. Richards, Chicago & North Western Ry., Chicago. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Railroad Trespassing—Its Prevention a Public Duty. By A. A. Krause, M. K. & T. Ry., St. Louis, Mo. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Health Service Work as an Efficiency Factor. By Dr. Otto P. Geier, Cincinnati Milling Machine Co., Cincinnati, Ohio. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Health Education. By Dr. L. G. Shoudy, Bethlehem Steel Co., South Bethlehem, Pa. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

First Aid. By Dr. J. C. Bloodgood, Johns Hopkins University, Baltimore, Md. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Physical Examination of Employes. By Dr. Wilbur E. Post, Peoples Gas, Light & Coke Co., Chicago. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Occupational Diseases. By Dr. E. R. Hayhurst, Ohio State Board of Health, Columbus, Ohio. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Health Insurance. By A. W. Whitney, National Workmen's Compensation Service Bureau, New York City. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Railway Crossing Accidents: (a) Their Cause. (b) How They Can Be Reduced. By John S. Rockwell, Buffalo, Rochester & Pittsburgh Ry., Rochester, N. Y. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

In Order to Secure the Best Results in Safety Work What Should Be the Relation of the Railroad Company and Its Officers to the Safety First Organization? By J. M. Guild, Union Pacific R. R., Omaha, Neb. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

How Should the Members of Safety Committees Be Selected and for What Length of Time Should They Serve? By E. R. Scoville, Baltimore & Ohio R. R., Baltimore, Md. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

How the Attitude of the Public Toward the Railroad Company Is Influenced by Systematic Safety Work. By Russel A. Sears, Boston Elevated Ry. Co., Boston. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

How Graphic Charts and Bulletins Help in Safety Education. By Harold W. Clapp, Columbus Ry., Power & Light Co., Columbus, Ohio. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Safety and Efficiency—How a New Member Tackles the Problem. By Julien H. Harvey, Kansas City Ry. Co., Kansas City, Mo. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Achievements and Possibilities of Accident Prevention in American Industries. By Dr. F. L. Hoffman, Prudential Life Insurance Co., Newark, N. J. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

How the Safety Movement Is Helping the Electric Railway Industry Meet Its Problems. By Prof. H. H. Norris, Electric Railway Journal, New York City. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Employment. By A. H. Young, Illinois Steel Co., South Chicago, Ill. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Origin of Safety Methods and Prevention of Infection. Dr. C. C. Booth, Republic Iron & Steel Co., Youngstown, Ohio. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

The Duties of the Visiting Nurse. By (Miss) Florence Wright, Clark Thread Co., Newark, N. J. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20

Digitized by Google

Mine Inspection. By William H. Jobe, Crystal Falls, Mich. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Safety in Hoisting and Slope Haulage. By O. P. Hood, U. S. Bureau of Mines, Pittsburgh, Pa. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Welfare Work. By E. E. Bach, Ellsworth Collieries Co., Ellsworth, Pa. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Mine Rescue Apparatus—Its Value as a Safety Measure. By Oscar Cartledge, Ottawa, Ill. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Education of Miners in Safety. By C. S. Stevenson, Cleveland Cliffs Iron Co., Ishpeming, Mich. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Metal Mine Accidents and Their Prevention. By Prof. F. W. Sperr, School of Mines, Houghton, Mich. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Paper Mill Lighting. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Guarding of Electrical and Steam Machinery in Paper Mills. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

FIRE PREVENTION

Topics for Fire Prevention Meetings and Suggestions for Their Arrangement. National Fire Protection Association, Boston.

Police and Fire. By G. W. Atwood, Youngstown Sheet & Tube Co., Youngstown, Ohio. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Regulations of National Board of Fire Underwriters for Manufacture and Installation of Steam Fire Pumps. Recommended by National Fire Protection Assoc. From National Fire Protection Association.

Fire Prevention on Electrical Stations. By H. L. Gantt. Electrical Review and Western Electrician. Sept. 23, 1916.

Abolition of the Wood Shingle Roof a Necessity. By Thos. W. Haney, Fire Chief, Jacksonville, Fla. Fire Protection. Sept., 1916.

Today and Tomorrow in Fire and Accident Prevention. As Seen by Franklin H. Wentworth and W. H. Cameron. "Factory." Oct., 1916.

Annual Report of the Bureau of Combustibles and Fire Risks, Newark, N. J. By C. Albert Gasser, Ch. of Bureau. Fire Engineer. Sept., 1916.

Electrical Data. Review of recent fires and accidents due to electrical causes; discussion of underwriting lessons to be drawn. Underwriters' Laboratories, Chicago.

Report of Special Committee on Automatic Sprinklers. Internat. Assoc. of Fire Engineers. Fire Protection. Sept., 1916.

Report on the City of Buffalo, N. Y. National Board of Fire Underwriters.

Report on the City of Altoona, Pa. National Board of Fire Underwriters.

Fire Hazards of the War in American Industry. Extract from annual report of Benjamin Richards, chairman, committee on Manufacturing Risks and Special Hazards, National Fire Protection Association, Boston.

The Utility of the Triple Combination Pumping Engine. By John C. Moran, Fire Chief, Hartford, Conn. Fire Protection. Sept., 1916.

Safety First Federation of America. Report of Proceedings of Fire Prevention Committee. June 16, 1916.

Fire Detection. By M. J. Grace. Paper read before annual meeting of South Carolina State Firemen's Assoc. Fire Engineer. Sept., 1916.

Mine Fires and Their Recovery. By Prof. J. C. Roberts, Colo. School of Mines, Golden, Colo. Proceedings of fifth annual congress, National Safety Council. Oct. 17-20.

Character of Forest Fires. By F. R. Meier. Fire Engineer. Sept., 1916.

Convention of Safety First Federation

PLANS have been completed for the second annual convention of the Safety First Federation of America to be held in Baltimore on December 7, 8 and 9.

The convention will make the Emerson Hotel its headquarters. The business sessions will be held here, and most of the delegates will be entertained in the hotel. The Baltimore society is expecting several hundred persons to attend the convention, including some of the foremost street traffic, fire prevention, transportation and health authorities in the country.

Darwin P. Kingsley, president of the New York Life Insurance Company, and president of the Safety First Federation, will preside at the meetings. Mr. Kingsley is also chairman of the program committee. Other members of the committee are: Harold W. Newman, commissioner of public safety, New Orleans, La.; Charles L. Bernheimer, treasurer of the Safety First Federation, and president of the Safety First Society of New York; Robert D. Carter, marshal of police, Baltimore, and John T. Broderick, supervisor of Special Bureaus, Baltimore & Ohio Railroad Company.

Digitized by Google

MATERIALS, APPARATUS, PROCESSES

IN THIS DEPARTMENT APPEAR REVIEW-ARTICLES ON PRODUCTS WHICH CONSERVE LIFE AND PROPERTY. THIS INFORMATION IS SECURED LARGELY FROM MANUFACTURERS. WE ACCEPT NO PAYMENT FOR ITS PUBLICATION

SAFETY EXHIBIT UNDER AUSPICES OF NATIONAL SAFETY COUNCIL, 1916 CONVENTION, DETROIT

For the first time the National Safety Council authorized, under its auspices, an exhibit of devices and safeguards used in protecting life and property against injury and destruction. The Armory was selected as the most suitable building in Detroit for holding this exhibit. The arrangements were well carried out and it was the general opinion that the Safety Exhibit was a successful and valuable feature of the convention.

The attendance was well over 8,000 during the five days of the exhibit. In order that the exhibit would not conflict with the convention the doors of the Safety Exhibit were not opened until 3 p. m. each day.

The Ford Motor Company and Packard Motor Company kindly furnished their bands and provided excellent music. The Safety Exhibit has proved itself to be a valuable means of diffusing information on Safeguards and the National Safety Council no doubt will make this a permanent feature each year.

The following is a complete list of exhibitors:

AETNA LIFE INSURANCE COMPANY, HARTFORD, CONN. Very attractive exhibit of photographs, charts and views of the Accident and Liability Depts. Also model of modern factory with safeguards and model of old type of factory without safeguards.

ALLEN MANUFACTURING COMPANY, HARTFORD, CONN. Safety Set Screws.

AMERICAN ABRASIVE METALS COMPANY, New York, N. Y. "Feralun" Anti-Slip Treads. Photographs illustrating safety and dangerous stairs.

AMERICAN MUSEUM OF SAFETY, NEW YORK CITY.

BALTIMORE & OHIO RAILROAD. Models of cars and safety apparatus used on this road. Photographs, charts and views.

CHICAGO EYE SHIELD COMPANY, CHICAGO, ILL. Eye protectors.

COMMONWEALTH STEEL COMPANY, GRANITE CITY, ILL. Exhibit of photographs showing accident prevention work of this company, also guards and other safety devices.

DAVIS LIGHTING COMPANY, CHICAGO, ILL. Industrial Flood Lighting.

DETROIT BOARD OF COMMERCE. Photographs and charts showing safety appliances.

DETROIT FUSE & MANUFACTURING COMPANY, DETROIT, MICH. Square "D" Enclosed Safety Switches.

DETROIT LOCAL SAFETY COUNCIL. Photographs, charts and literature showing activities of the Detroit Local Council.

DE VILBISS MANUFACTURING COMPANY, TOLEDO, OHIO. Aeron System Steel Fumexer.

DRAEGER OXYGEN APPARATUS COMPANY, PITTSBURGH, PA. Draeger Oxygen Apparatus Company exhibited its latest resuscitating device, the Type "B" Pulmotor which is particularly adaptable for industrial emergency rooms.

FORD MOTOR COMPANY, DETROIT, MICH. Models of workmen's houses, photographs and a working model of the Ford plant.

FYR-FYTER COMPANY, DAYTON, OHIO. Fyr-Fyter Fire Extinguishers.

HERBERT GARNETT, TOLEDO, OHIO. Respirators.

F. A. HARDY & COMPANY, CHICAGO, ILL. Exhibit of Hardy eye protectors, respirators, helmets and masks.

KIMBERLY-CLARKE COMPANY, NEENAH, WIS. Paper rugs, photographs, charts showing the features of safety campaign. Also chart showing the manufacture of paper from wood pulp.

JULIUS KING OPTICAL COMPANY, NEW YORK. Comprehensive exhibit of industrial eye protectors, babbitting masks, etc.

KRANTZ MANUFACTURING COMPANY, BROOKLYN, N. Y. Krantz safety switches and safety electrical equipment.

LIFE SAVING DEVICES COMPANY, CHICAGO, ILL. Lungmotors.

LINEMEN PROTECTOR COMPANY, DETROIT, MICH. Linemen protector charts and photographs.

A. K. MACDONALD, HAMILTON, CANADA. Improved railroad crossing gate lamp attachment.

THE MADDEN COMPANY, CHICAGO, ILL. Richter Blue Flag Derail.

MICHIGAN WORKMEN'S COMPENSATION MUTUAL INSURANCE COMPANY, DETROIT, MICH. Attractive exhibit of pictures, slides, charts, etc., showing how accidents are caused and how they can be prevented.

MINE SAFETY APPLIANCES COMPANY, PITTSBURGH, PA. Safety signs, miners' safety lamps, photographs.

MULTI-METAL SEPARATING SCREEN COMPANY, NEW YORK CITY. Pulmosan Sand Blast Helmet, Dust Hood, Respirators, masks, etc.

NATIONAL COMMITTEE FOR THE PREVENTION OF BLINDNESS, NEW YORK. Pictures illustrating eye protection.

NATIONAL SAFETY COUNCIL, CHICAGO, ILL. Charts, photographs and models illustrating industrial safety.

NEW JERSEY ZINC COMPANY, PALMERTON, PA. Unusual attractive exhibit models, photographs, showing safety work of this company among their employees Also specimens of products used by this company in manufacturing their different products.

NEW YORK CENTRAL LINES. Charts, photographs and models illustrating the safety work of this railroad to safeguard both operators and passengers.

NORFOLK & WESTERN RAILROAD. Attractive exhibit consisting of photographs, models, charts and safety devices used on this road.

Digitized by Google

NORTON COMPANY, WORCESTER, MASS. Norton safe guards, floor grinding wheels, photographs, illuminated slides, safety bulletin.

OLIVER MACHINERY COMPANY, GRAND RAPIDS, MICH. Woodworking machinery equipped with safe guards, and photographs.

OTIS ELEVATOR COMPANY, NEW YORK CITY. Flexible guide clamp safety device.

PATHE FREERES, DETROIT, MICH. The Pathescope.

PURO SANITARY DRINKING FOUNTAIN COMPANY, HAYDENVILLE, MASS. Puro Sanitary Drinking Fountains.

PYRENE MANUFACTURING COMPANY. Pyrene Fire Extinguisher, oily waste can and First-Aid kit.

RAILWAY REVIEW, CHICAGO, ILL.

RESPIRATORY APPARATUS COMPANY, CHICAGO, ILL. The Life Motor.

JOS. T. RYERSON & SON, CHICAGO, ILL. Mason Safety Treads.

SAFETY ENGINEERING. The Magazine of Safety.

SAFETY FIRST SUPPLY COMPANY, PITTSBURGH, PA. Comprehensive exhibit of industrial safety devices including first-aid cabinets, safety and danger signs, safety ladder shoes, safety cans, eye protectors, safety lanterns, Williams stretcher, First-Aid equipment, etc., photographs of safe guards and electric lighted bulletin boards.

SCIENTIFIC TEMPERANCE FEDERATION, BOSTON, MASS. Charts showing bad effect of alcohol, and how alcohol causes inefficiency and accidents.

SCOTT PAPER COMPANY, PHILADELPHIA, PA. Scott tissue towels.

R. P. SMITH & SON COMPANY, CHICAGO, ILL. Safety congress shoes.

STRONG, KENNARD & NUTT COMPANY, CLEVELAND, O. Eye protectors and photographs.

SURTY GUARD COMPANY, CHICAGO, ILL. Stamping press guards and saw guards.

THOMPSON ELECTRIC COMPANY, CLEVELAND, O. The Thompson Safety-Cut-Out hanger.

UNITED STATES BUREAU OF MINES. Photographs, charts and safety devices used in mines.

WALSH PRESS & DIE COMPANY, CHICAGO, ILL. Walsh guard for presses.

THE WESTERN ELECTRIC COMPANY, DETROIT, MICH. Davis Flood lamp.

WHEELER & HOLCOMB, CHICAGO, ILL. Molders, leggings, gloves, etc.

WINDOW CLEANERS IMPROVED BELT & DEVICE COMPANY, CHICAGO, ILL. Safety device for window cleaners.

THE SAFETY FIRST SUPPLY CO.

The Safety First Supply Company, Pittsburgh, Pa., has recently completed an attractive and interesting exhibition of its products at the Fall Festival held in Huntington, W. Va. This exhibition was installed in the interests of its Southern representatives, the Huntington Supply & Equipment Co., Huntington, W. Va., and consisted of a complete plant emergency hospital equipment, porcelain enamel signs, electrically illuminated bulletin boards, emergency outfits, first aid equipments, goggles, drinking fountains, drinking cups, etc., and was pronounced by all to be the most attractive and interesting exhibit at the Festival. Mr. J. E. Thomas, secretary of the Huntington Supply & Equipment Co., and Mr. H. Blain Lacy, president of the Safety First Supply Co., were in charge.

During the week of October 2, this company, at the special request of some of the manufacturers, placed an exhibit at the Massillon Industrial Exposition and Efficiency Show, held by the Chamber of Commerce at Massillon, Ohio. Mr. E. F. Shipman, secretary of the company, was in charge of the exhibit there.

Booth No. 13 at the Detroit Congress of the National Safety Council was occupied by this company and the Draeger Oxygen Apparatus Company, with an elaborate and attractive exhibition. Their lines are so widely diversified that they exhibited goods of interest to the safety director of practically every industry. Mr. H. W. Dinker, treasurer of the Safety First Supply Company, and Mr. H. E. Metcalf, vice-president of the Draeger Oxygen Apparatus Company, were in charge.

While these exhibitions are an expensive method of advertising, this company is willing to go to the expense necessary for the purpose of public education which these exhibitions accomplish, and will welcome invitations from any source wherein the greatest good may be done.

MULTI-METAL COMPANY TO HAVE NEW HEADQUARTERS

After December 1 the Multi-Metal Separating Screen Company will be located at 247 West Nineteenth street, New York City. This change has been contemplated for some time because of the ever increasing volume of the company's business and the limited space in its present location.

The new quarters will afford facilities for a large showroom in which all the products of the company will be attractively displayed. The location of the new quarters is also convenient because it is nearer the business centre of the city than its present headquarters which are quite a distance uptown.

During the past year this concern has introduced a number of very good "Pulmosan" safety devices among which are: Respirators, sand-blast helmets, dust hoods, acid masks, babbitt masks, wire goggles, etc., etc. The company welcomes inquiries.

STEEL EQUIPMENT

Steel Equipment is rapidly becoming standardized in offices, factories, railroads, colleges and gymnasiums.

This is due to the fact that steel equipment gives the greatest satisfaction because it is permanent, fire-proof and sanitary.

The Bernstein Mfg. Co., of Philadelphia, Pa., manufactures a complete line of steel equipment for all industrial purposes: complete sanitary hospital equipments, which are most valuable in safety campaigns, also steel lockers, wardrobes, shelves, etc.

The Bernstein all-steel equipment has been favorably known for 25 years to a large number of manufacturing concerns who maintain first aid rooms. Every part of this first aid equipment has been developed and designed for practical use. It is sanitary and aseptic finished in best white enamel and backed by the Bernstein Guarantee.

Complete catalogs concerning the above mentioned products will gladly be sent by the manufacturer.

Digitized by Google

FURTHER APPROVAL OF EVANS "ALMETL" FIRE DOORS

The Merchant & Evans Company, Philadelphia, Pa., is announcing that the Inspection Department of the Associated Mutual Fire Insurance Companies, Boston, through the Factory Mutual Laboratories have approved Evans "Almetl" fire door for openings up to 80 square feet and will be included in the October edition of the approved list.

Merchant & Evans have already received the highest standard, class A approval, both fire and accident, from the Underwriters' Laboratories, Chicago, for the Evans "Almetl" fire door. The Underwriters' Laboratories have also granted the best standard, class D approval, both fire and accident, for shutters manufactured by this company.

In addition to the branch offices maintained by Merchant & Evans in leading cities about 160 well rated, experienced contracting and erecting licensees throughout the country are employed in the distribution and installation of Merchant & Evans fire doors and shutters.

UNDERWRITERS' LABORATORIES'

Recent Approvals and Reapprovals

The Underwriters' Laboratories, Inc., Chicago, under the direction of the National Board of Fire Underwriters and in co-operation with the Workmen's Compensation Service Bureau, maintains laboratories for the examination and testing of appliances and devices, and enters into contracts with the owners and manufacturers of such appliances and devices, respecting the recommendation thereof to insurance organizations.

The object is to give to the user the best obtainable opinion on the merits of appliances, devices, machines and materials in respect to life and fire hazards and accident prevention.

ANCHOR GYPSUM BLOCKS FOR CORRIDOR AND ROOM PARTITIONS. American Gypsum Co., Mfr., Port Clinton, Ohio. Factory at Port Clinton, Ohio.

ANTI-SLIP TREADS. Ryerson & Son, Joseph T., Submittor, 16th and Rockwell Streets, Chicago, Ill.

CHEMICAL EXTINGUISHERS, one qt., pump type, Fyr Fyter Co., 32 S. Jefferson Street, Dayton, Ohio. Hand chemical extinguisher made of brass. About 1 qt. capacity.

CLASS C, PREPARED ROOF COVERINGS. Flintkote Mfg. Co., 88 Pearl Street, Boston, Mass. Asphalt-rag-felt prepared roof covering. Prepared type smooth, grit surfaced and reinforced. Single thickness. Assembled according to directions furnished.

COUNTERBALANCED STEEL ELEVATOR DOOR. Harris Co., S. H., Mfr., 610 W. Lake Street, Chicago, Ill.

COUNTERBALANCED STEEL ELEVATOR DOOR. (Slide-up type.) Peelle Co., The, Mfr., Stewart Avenue and Harrison Place, Brooklyn, N. Y.

DRY POWDER, FIRE RETARDING PAINT. Becker-Moore Paint Co., The, Mfr., South 2nd Street, Carroll and Soulard Streets, St. Louis, Mo.

DRY POWDER, FIRE RETARDING PAINT. Moore & Co., Benjamin, Mfr., 401 N. Green Street, Chicago, Ill. Factories at Chicago and New York.

EXPANDED METAL FOR GUARDS. Consolidated Expanded Metal Cos., The, Mfr., Braddock, Pa.

FIRE PAIL, 12 quarts, Waggoner Sanatory Fire Bucket. Diener Mfg. Co., Geo. W., Mfr., 400 Monticello Avenue, Chicago, Ill.

FRAMES (Double Type). Central Metallic Door Co., Mfr., 2414 W. 22nd Street, Chicago, Ill.

FRAMES (Single and Double Types). Solar Metal Products Co., Inc., Mfr., 470 Starr Avenue, Columbus, Ohio.

GLOBE ISSUE "B" ¼-, 5/16 AND ⅜-in.. Open Sprinklers. Globe Automatic Sprinkler Co., Mfr., 2019 Washington Avenue, Philadelphia, Pa.

GUARDS FOR MACHINERY. Surty Guard Co., Mfr., 62 E. Lake Street, Chicago, Ill.

HANGERS FOR AUTOMATIC SPRINKLER EQUIPMENTS. Automatic Sprinkler Co. of America, Mfr., 123 William Street, New York City.

HAZARDOUS LIQUID VALVES. Lavigne Mfg. Co., Mfr., 625 Commonwealth Avenue, Detroit, Mich.

HAZARDOUS LIQUID VALVES, U. S. Novelty Mfg. Co., Mfr., Collins & Belt Line R. R., Detroit, Mich.

HOLLOW METAL FIRE WINDOW FRAME. Campbell Co., The Harry E., Mfr., 8 West 40th Street, New York City.

HOLLOW METAL FIRE WINDOW FRAMES. Friedrich Co., E. H., Mfr., 73 Sarjeant Street, Holyoke, Mass.

HOLLOW METAL FIRE WINDOW FRAME. Pomeroy Co., S. H., Mfr., 282 East 134th Street, New York City. Hollow metal fire window frame and sash for wired glass (heavy metal type).

INSIDE HAND-OPERATED DISCHARGE DEVICE. Nu-Wa Pump Co., Mfr., 21 North Alabama Street, Indianapolis, Ind.

INSULATED CABINETS. McCaskey Register Co., The, Mfr., Alliance, Ohio.

LADDER FEET. Chesebro-Whitman Co., Inc., Mfr., 64th Street and 1st Avenue, New York, N. Y.

Digitized by Google

SAFETY ENGINEERING

Vol. 32 DECEMBER, 1916 No. 6

Copyright, 1916, by The Safety Press, Inc. All Rights Reserved

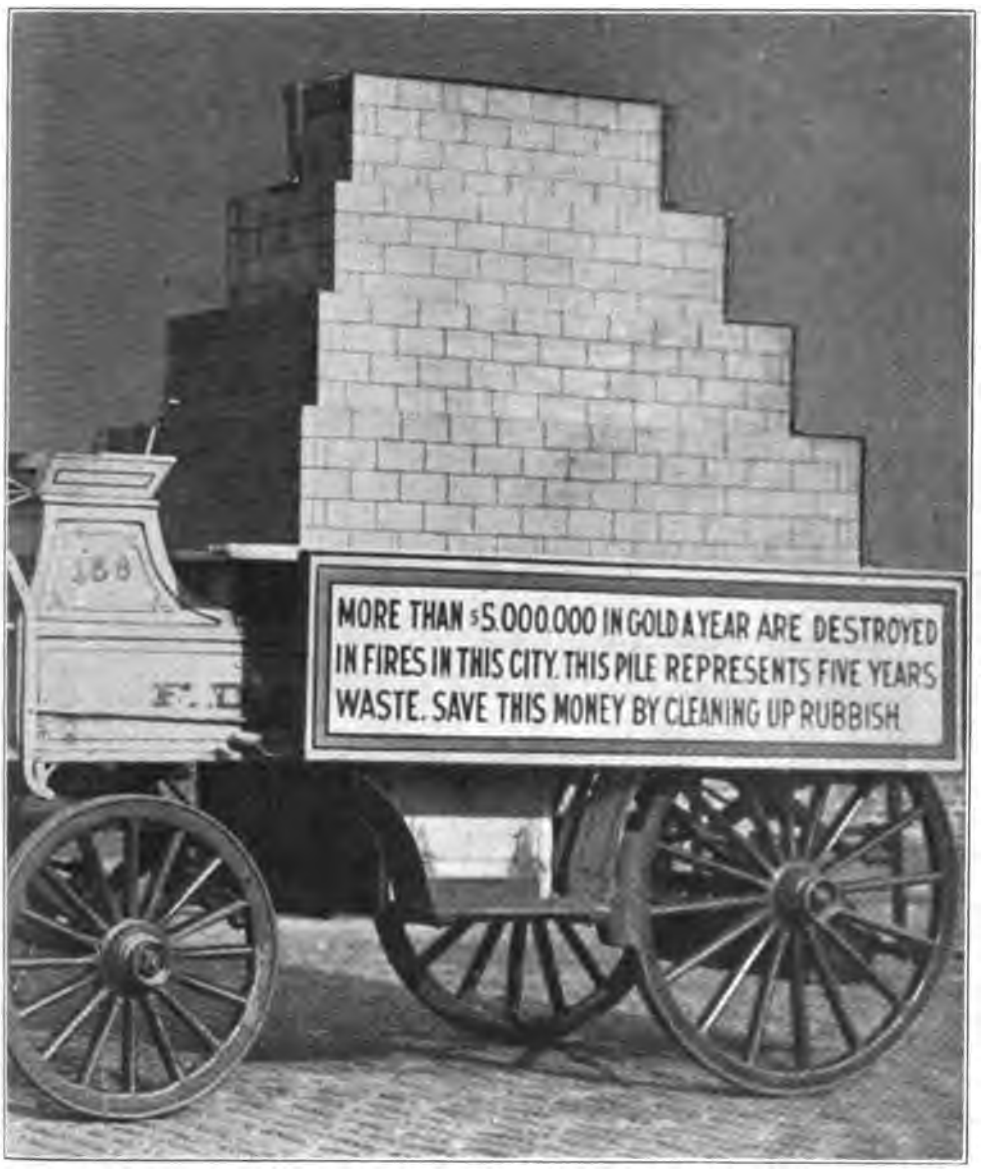

MORE THAN $5.000.000 IN GOLD A YEAR ARE DESTROYED
IN FIRES IN THIS CITY. THIS PILE REPRESENTS FIVE YEARS
WASTE. SAVE THIS MONEY BY CLEANING UP RUBBISH

Photo by Social Press Association

Fire Prevention Day in 1916 in New York City was an interesting event. But while the Fire Department was parading, it was true that important fire prevention orders issued two years ago for the protection of public schools had not been complied with. (See Fire Commissioner Adamson's article.)

Digitized by Google

Killed and Injured in Fires in 1916

SAFETY ENGINEERING presents herewith a list, compiled from its weekly fire bulletins, of a number of persons killed and injured in fires in the United States and Canada from January 1, 1916, to November 30, 1916.

The greatest number of deaths occurring in a single fire was reported from El Paso, Texas, where 20 prisoners in the city jail were burned to death. The fire was caused by the dropping of a lighted match into a tub of gasoline which was being used for disinfecting purposes.

The next largest number of fatalities was caused by a fire in a motion picture theater at Wallaceton, Va., where 13 persons were killed and 30 others were injured.

In the industries presenting peculiarly hazardous conditions, 22 lives were lost in fires or explosions in munitions plants, and many others were injured. Sixteen persons died from fires in chemical works with a much larger number of injuries.

Thirty-four persons sacrificed their lives in hotel and lodging house fires and many more were injured. Various causes are assigned for this class of fires, but in three fires during the first two months of the year, in which 15 persons were killed, the respective causes given were: "Started in bake-shop, cause unknown"; "explosion of gasoline used for dry-cleaning"; "started in restaurant kitchen, kettle of grease overturned."

Apartment Houses

CLEVELAND, OHIO. Mar. 28. Foster apts. KILLED, 2. INJURED, several.

PHILADELPHIA, PA. Jan. 2. Bellevue apts. KILLED, 3. INJURED, 20.

Chemical and Pharmaceutical Works

NIAGARA FALLS, N. Y. Mar. 7. Niagara Electro-Chemical Co. KILLED, 1. INJURED, several.

COPPER HILL, TENN. Mar. 21. Carcolite Chemical Co. KILLED, 1.

DRUMMONDVILLE, QUE. Aug. 20. Aetna Chemical Co. KILLED, 5. INJURED, 14.

LORILLARD, N. J. Sept. 9. Hydro-Carbon Products Co. INJURED, 1.

LONG ISLAND CITY, N. Y. Oct. 17. Oakes Mfg. Co. Mfr. dyes. KILLED, 9.

Churches

BEAUPORT, QUE. Feb. 21. Parish church. KILLED, 1.

Clothing Factories

PITTSBURGH, PA. Aug. 25. Sell Bros. Tailors. OVERCOME BY GAS, 25 firemen.

Clubhouses, City and Country

TORONTO, ONT. Feb. 16. American Club. KILLED, 1. INJURED, 2.

SAN ANTONIO, TEX. Mar. 26. San Antonio Country Club. KILLED, 6.

Coal and Lumber Yards

WILKES-BARRE, PA. Mar. 9. Hollenback, Lehigh & Barre Coal Co. KILLED, 6.

Conflagrations

DRUMRIGHT, OKLA. Jan. 29. Sev. bus. bldgs. KILLED, 2.

GALETON, PA. Jan. 19. Sev. bus. bldgs. and dwlgs. INJURED, 2 firemen.

PASSAIC, N. J. Feb. 24. Sev. tenement dwlgs. INJURED, 2. LEFT HOMELESS, 240 persons.

Digitized by Google

NASHVILLE, TENN. Mar. 22. Sev. bus. bldgs. and dwlgs. KILLED, 1. INJURED, several.
NORTH COLLINS, N. Y. Mar. 30. Three bus. bldgs. KILLED, 2.
CREEDMOOR, TEX. Apr. 15. Sev. bus. bldgs. INJURED, 4.
NEEDLES, CAL. June 24. Fifteen bus. bldgs., 2 hotels and 4 dwlgs. KILLED, 5. INJURED, several.
GLEN ISLAND, N. Y. Sept. 13. Five bldgs. INJURED, 1.

Department Stores

WILMINGTON, DEL. June 5. Lippincott's dept. store. INJURED, several firemen.

Dwellings, Ordinary, City

PUNXSUTAWNEY, PA. Jan. 18. M. Warden. Dwlg. KILLED, 2. INJURED, 1.
DU BOIS, PA. Feb. 15. D. Faulkner. Dwlg. KILLED, 4. INJURED, 4.
BROOKLYN, N. Y. Feb. 4. 243 Hancock st. C. Tag. Dwlg. KILLED, 6.
RED RAPID BRIDGE, N. B. Mar. 9. R. Sprague. Dwlg. KILLED, 3.
SAGINAW, MICH. Mar. 17. P. Schmidt. Dwlg. KILLED, 4.
LOUISVILLE, KY. Mar. 16. I. Bridges. Dwlg. INJURED, 1 fireman.
CAMDEN, N. J. Mar. 6. N. Walter. Dwlg. KILLED, 1.
JAMAICA, N. Y. Mar. 9. J. F. Keale. Dwlg. INJURED, 1.
ELLIOTTSBURG, PA. Mar. 2. D. Stambaugh. Dwlg. KILLED, 2.
LUDOWICI, GA. Mar. 21. J. Nedd. Dwlg. KILLED, 2.
SCRANTON, PA. Apr. 1. P. Marion. Dwlg. KILLED, 5. INJURED, 3.
LITCHFIELD, ME. May 13. L. Larrabee. Dwlg. KILLED, 3.
SARANAC, N. Y. Oct. 15. L. Gonyea. Dwlg. KILLED, 2.

Dwellings, Ordinary, Country

GLEN GOVE, L. I., N. Y. Nov. 10. F. W. Woolworth. Dwlg. INJURED, 1 fireman.
WEST CAPE MAY, N. J. Nov. 26. L. Wilson. Country dwlg. KILLED, 7.

Farm Property

Near JACKSON, ME. Jan. 9. E. Tasher. Farm bldgs. KILLED, 2.
COATICOOK, QUE. Apr. 3. P. Dragon. Barn. KILLED, 1.
CLAY CENTER, KAN. July 17. J. Hanson farm. Granary. KILLED, 3. INJURED, 3.

Fertilizer and Acid Plants

SLOAN, N. Y. Mar. 12. International Agricultural Corp. Fertilizer plant. SLIGHTLY BURNED, 7 employes.

Flats and Tenements

NEW YORK, N. Y. Feb. 14. R. Zollinsky. Tenement. KILLED, 2. INJURED, 1.
NEW YORK, N. Y. Nov. 3. 358 Cherry st. Six-sto. tenement. KILLED, 3.

Forest Fires

DODGE CITY, KAN. Mar. 6. Prairie fires in western part of State. KILLED, 1. INJURED, 1.

Digitized by Google

Garages and Auto Repair Shops

WASHINGTON, D. C. Feb. 16. Probey-Arrison Motor Co. INJURED, 1 fireman.

Hospitals and Sanitariums

FARNHAM, QUE. Oct. 26. St. Elizabeth's Hospital. KILLED, 11. INJURED and MISSING, many.

Hotels and Lodging Houses

WATERBURY, CONN. Jan 4. Connecticut Hotel. KILLED, 1. INJURED, 6.
CADOSIA, N. Y. Jan. 23. Hotel Lacey. KILLED, 3.
SCHENECTADY, N. Y. Jan. 11. Mrs. Harrington. Rooming house. KILLED, 4. INJURED, 7.
ATLANTIC CITY, N. J. Feb. 4. Hotel Overbrook. KILLED, 5. INJURED, 5.
PORTLAND, ME. Feb. 7. Congress st. Lodging house. KILLED, 2.
NEW YORK, N. Y. Feb. 22. 155 W. 44th st. Lodging house. KILLED, 5. INJURED, several.
PITTSBURGH, PA. Feb. 22. Slater Hotel. KILLED, 1.
HALIFAX, N. S. Mar. 26. Pleasant st. Lodging house. KILLED, 4. INJURED, several.
MADISON, ILL. Apr. 22. Rooming house. INJURED, 4.
SANTA CLARA, N. Y. Aug. 28. Windsor Hotel. KILLED, 1. INJURED, 1.
BUFFALO, N. Y. Oct. 1. Swan st. Lodging house. KILLED, 1.
ANDOVER, CONN. Oct. 17. Hotel. KILLED, 3.
ROSCOE, N. Y. Nov. 19. Faubel House and Beaverkill House. INJURED, 1.

Institutional Buildings

BUFFALO, N. Y. Jan. 9. Father Baker's Protectory. INJURED, 1 fireman.
NEW YORK, N. Y. Mar. 20. Day Nursery. KILLED, 4.

Loft Buildings

NEW YORK, N. Y. Oct. 25. Goldberg & Keavitz. Mfr. trousers. KILLED, 2. INJURED, several.

Manufactories, Miscellaneous

BUFFALO, N. Y. Jan. 24. Kelker Blower Co. Plating mill exhausts and ventilators. KILLED, 4. INJURED, 4. MISSING, several.
RENFREW, ONT. May 5. O'Brien munitions plant. INJURED, 6.
NEW YORK, N. Y. May 31. George Haynor rope wks. OVERCOME BY SMOKE, 18 firemen.
GRAND RAPIDS, MICH. June 7. Valley City Chair Co. INJURED, 2 firemen.
PHILADELPHIA, PA. June 12. George D. Wetherill & Co. Paint and varnish fac. KILLED, 2.
MILWAUKEE, WIS. Aug. 27. Waltham Piano Mfg. Co. KILLED, 2. INJURED, 4.
PHOENIX, N. Y. Sept. 24. Sinclair chair fac. KILLED, 1. INJURED, several.
CHICAGO, ILL. Oct. 15. S. Karpen Bros. Furn. fac. KILLED, 9. INJURED, 1.
LIMA, OHIO. Nov. 24. Lima Mattress Co. INJURED, 6.

Digitized by Google

Mercantiles, Miscellaneous

DETROIT, MICH. Jan. 28. E. C. Kinsel. Drug store. OVERCOME BY FUMES, 100 firemen.
TORONTO, ONT. Feb. 2. Levinter Furniture Co. INJURED, 1 fireman.
ROCHESTER, N. Y. July 6. Smith, Beir & Gormly. Dry goods. INJURED, 5 firemen.

Mercantiles, Tenant Buildings

SEATTLE, WASH. Jan. 26. Talbot Walker bldg. KILLED, 6.
NEW YORK, N. Y. July 27. 1828 Amsterdam ave. Mercantile tenant bldg. INJURED, 4.

Metal Workers

BRIDGEPORT, CONN. Mar. 22. John Hamilton Brass Wks. INJURED 1.

Mining Properties

FAIRMONT, W. VA. Sept. 16. Consolidation Coal Co. Mine No. 6. INJURED, 4.

Miscellaneous

GIBBSTOWN, N. J. Jan. 14. Du Pont Powder Co. INJURED, 3.
CARNEY'S POINT, N. J. Jan. 28. Du Pont Powder Co. INJURED, 7 employes.
CLEVELAND, OHIO. Feb. 28. Sullivan & Prendergast Co. Paving contractors. KILLED, 2.
GIBBSTOWN, N. J. May 15. E. I. du Pont de Nemours Powder Co. KILLED, 11. INJURED, several.
MOUNT UNION, PA. Sept. 20. Powder mill. KILLED, 8.
GRAFTON, ILL. Oct. 5. Illinois Powder Co. Mills. KILLED, 3. INJURED, several.

Motion Picture Factories and Film Exchanges

DETROIT, MICH. May 18. Universal Film Co. OVERCOME BY SMOKE, 6 persons.

Oil Works and Tanks

TOLEDO, OHIO. Feb. 3. Craig Oil Co. INJURED, 1 fireman.
BRUNSWICK, GA. Mar. 10. Varyan Rosin & Turpentine Co. INJURED, 1.
MIDDLETOWN, N. Y. Apr. 1. D. W. Fenton & Co. Oil plant. INJURED, 3.
RICHMOND, WASH. June 12. Standard Oil Co. Storage plant. KILLED, 1.
CHICAGO, ILL. Aug. 23. Standard Oil Co. KILLED, 1. INJURED, several firemen.
CHARLES CITY, IA. Aug. 25. Standard Oil Co. INJURED, 12.

Places of Assembly

ALBANY, N. Y. Jan. 27. Odd Fellows Temple. INJURED, 1 fireman.

Public Buildings

OTTAWA, CAN. Feb. 3. Canadian Parliament bldg. KILLED, 7. INJURED, 2.
EL PASO, TEX. Mar. 6. City jail. KILLED, 20.

Digitized by Google

Railroad Property

BLUEFIELD, W. VA. Jan. 26. Norfolk & Western R. R. INJURED, 30.
CANTON, MD. June 13. Pennsylvania R. R. Elev. No. 3. KILLED, several. INJURED, 40.

Schools and Colleges

OSKALOOSA, IA. May 27. Penn College. KILLED, 2. INJURED, 2.
ST. LOUIS, MO. Oct. 5. Christian Brothers College. KILLED, 10. INJURED, 8 firemen.

Slaughter and Packing Houses

TOLEDO, OHIO. Apr. 20. Armour & Co. KILLED, 1 fireman. INJURED, 4 other persons.

Stables

PITTSFIELD, MASS. Apr. 23. Hamilton livery stab. KILLED, 2.
PAWTUCKET, R. I. Oct. 1. W. Mathewson. Stab. KILLED, 1.

Tanneries

PEABODY, MASS. Jan. 9. T. H. O'Shea. Tannery. KILLED, 1. INJURED, 1.

Theaters and Amusement Places

MEXIA, TEX. Feb. 16. Opera house. KILLED, 10. INJURED, several.
WALLACETON, VA. May 10. Motion pic. theater. KILLED, 13. INJURED, 30.

Vessels

BROOKLYN, N. Y. Feb. 16. Foot of Pioneer st. Pier 36. Steamers *Bolton Castle, Pacific Castle* and *Bellagio*. INJURED, several.
BROOKLYN, N. Y. Feb. 16. Foot of Pioneer st. Pier 36. Steamers *Bolton* S. S. Co. S.S. *Hermion*. INJURED, 3 firemen.
QUYON, QUE. July 27. S.S. *G. B. Greene*. KILLED, 4.
HALIFAX, N. S. Aug. 27. Western Union Tel. Co.'s steamer *Minia*. KILLED, 1.

Warehouses, Public Stores

NEW YORK, N. Y. Apr. 20. Pennsylvania Storage Warehouse and Carlton stab. INJURED, 6.
PHILADELPHIA, PA. June 7. North American Waste & Paper Supply Co. Warehouse. INJURED, 6 firemen.

Woodworkers

CHICAGO, ILL. July 31. Rittenhouse & Embree Lumber Co. KILLED, 1.
JACKSON, TENN. Aug. 21. Harlan Norris Stave fac. KILLED, 8. MISSING, several.

Digitized by Google

Safety for Public Schools

By Robert Adamson

Fire Commissioner, City of New York

FIRE PREVENTION changes, costing $500,000, are now being made in the public schools in accordance with recommendations of the fire department. This appropriation, made in two allotments of $250,000 each, one in November, 1915, the other in July, 1916, was based upon a comprehensive inspection of all the public schools undertaken under the direction of Fire Commissioner Adamson. In March, 1914, the mayor asked the fire commissioner to investigate statements to the effect that the public schools were firetraps. For this investigation Commissioner Adamson appointed a special board of inspection, consisting of Deputy Chief William T. Beggin, Battalion Chief Thomas F. Dougherty and Fire Prevention Inspector Francis G. Riley. Chief Beggin had been detailed at headquarters for eight years in charge of building inspections and assisted at the school inquiry following the Collinswood fire in 1908. Chief Dougherty is an instructor in the fire college and a former aide to Chief Bonner. Commissioner Adamson directed this board to review every existing fire prevention order against a public school and to make a personal inspection of every school as to the safety of which there might be any question. This investigation had scarcely begun when it became apparent that the establishment of uniform standards for fire safety in schools was a necessary prerequisite to intelligent fire prevention work in schools. Consequently, a complete set of fire safety standards for public schools was prepared by this special committee sitting with Chief Kenlon, of

Photo by Social Press Association

Are the school authorities of New York City "playing with fire"? "In numerous schools, wooden construction should be removed," the Fire Commissioner says.

Digitized by Google

FACTORY OWNERS AND WORKERS SHOULD COOPERATE IN MAKING WORKROOMS
SAFE. CLEAN UP RUBBISH. DON'T ALLOW SMOKING IN FACTORIES.

Photo by Social Press Association

A further desirable co-operation: The Board of Education and the public school teachers should co-operate to prevent the storage of old furniture and old books in the cellars and attics of public schools.

the uniformed force; Chief Hammitt, of the Bureau of Fire Prevention; C. B. J. Snyder, superintendent of buildings of the board of education, and Frank D. Wilsey, chairman of the building committee of the board of education. After several weeks a complete set of standards—80 in unmber—covering both structural and housekeeping conditions, was prepared, approved by Fire Commissioner Adamson, transmitted to the board of education, and was jointly adopted by both departments. Thus, by the joint action of the two boards, definite standards for fire prevention and fire protection in the schools were established.

After the adoption of the standards

Digitized by Google

FIRE DRILLS
WOULD
PREVENT
THIS
UNEMPLOYMENT AND FIRE PREVENTION
FIRES COST JOBS: WHEN THE SHOP BURNS YOU ARE OUT OF WORK.
THINK OF THIS AND DONT SMOKE CIGARETTES IN THE FACTORY.

Photo by Social Press Association

Fire drills, in schools as well as in factories, are effective aids in the saving of life. But why should the Board of Education of the City of New York permit wooden clothes lockers and wooden supply closets to exist in hallways through which children would have to pass in case of fire.

Chief Beggin and his special board proceeded with the inspection of the public schools. All existing orders were modified so as to make them conform to the new standards and all new orders were based upon the new safety code. Commissioner Adamson directed the special inspection board to notify him as they went along, of any buildings which they found to be unsafe and needing immediate attention. Seven such instances were reported and immediate action was taken. The most serious condition was that found at the Erasmus Hall High School in Brooklyn, where an old wooden building, built 129 years ago, was found to be in dangerous proximity to the new fireproof building. As a result

Digitized by Google

Photo by Social Press Association

Did any of the banners in this parade direct attention to the fact that main stairs and other stairs, in certain public school buildings, are wooden without fireproof doors at the ends?

Photo by Social Press Association

Cigarettes are dangerous in commercial and manufacturing buildings, in theaters, etc.—so are the carpentry shops operated in certain schools, with shavings, sawdust, etc., carelessly disposed of.

Digitized by Google

Photo by Social Press Association

Flames in schools that may destroy the lives of many innocent school children may be caused by the unsafe practice of using wooden coverings to protect steampipes.

of the action of the fire commissioner all of the upper floors of this building were vacated, a small wing of the building was removed, and many changes were made in the buildings. Since that time the building has been equipped with automatic sprinklers and has been protected in many ways from fire. In Public School No. 26, at Linoleumville, Staten Island, the inspectors found 1,000 pounds of calcium carbide stored in the cellar in the same room with various oils, sawdust and general school supplies. Here, also, the acetylene gas plant was found to be in poor condition and was being operated in violation of the rules of the department. Another example of the same kind of carelessness was found in the Curtis High School Annex, at Tottenville, Staten Island, where an automobile school with all the necessary accessories, engines, gasoline, etc., was being operated in the basement. In the basement of the new building of the same school a plumbing school was being conducted and kerosene oil under high pressure was being used in the various furnaces in the instruction of the class. Here, also, the acetylene gas plant was being operated in violation of the fire department rules. At Public School No. 84, Glenmore, Stone and Watkins avenue, Brooklyn, a moving picture show was found in full blast, the portable booth

Digitized by Google

BENZINE
GASOLINE
NAPHTHA
DANGER
WOMEN FOLKS TAKE NOTICE!
LAST YEAR YOU CAUSED 510 FIRES COSTING $206000
BY CARELESSNESS WITH BENZINE, GASOLENE AND NAPHTHA
IN YOUR HOMES. CLEAN UP BUT DON'T BLOW UP

Photo by Social Press Association

Paints and chemicals found in wooden closets in the public schools of New York are likewise dangerous.

for which was resting on strips of wood laid across the backs of chairs and the operator had no certificate of fitness. These, as well as the other dangerous cases reported by the inspectors, were immediately taken up with the board of education and the necessary remedial action was taken.

Commissioner Adamson's board inspected 203 public schools and made detailed reports regarding their conditions, and the fire prevention bureau issued such orders for changes as were recommended by the board as necessary. The board did not deem it necessary to inspect all of the other schools because they were in possession of data obtained by recent inspections.

After these fire prevention requirements had all been sent to the board of education, it was estimated by the superintendent of the board that $1,140,000 would be required to bring all of the schools up to the standard fixed in the safety code. Of this sum the board of estimate has already granted $500,000. The building superintendent of the board of education has estimated that all the requirements of the fire department recommended up to April of this year will be taken care of when this entire appropriation, namely, $1,140,000, has been received.

Money for fire prevention work in the public schools has been appropriated as follows:

April, 1908	$1,000,000
June, 1910	450,000
July, 1911	450,000
Nov. 1915	250,000
July, 1916	250,000

An attached table shows the schools in which the changes are now being made or about to be made and the nature of the work. In conformity with

Digitized by Google

Photo by Social Press Association

Fire Safety—Education may help the Board of Education of New York City to safeguard in a better manner the lines of exit in schools attended by these young girls.

Photo by Social Press Association

Fire Prevention Day furnished a fine object lesson of fire perils. But the lives of New York school children are still menaced by wooden stairs and non-fireproof windows that open on exit hallways.

the fire commissioner's suggestion, practically the greater part of the work consists of placing fireproof enclosure around stairways and removing fire hazard along the lines of exits. In other words, the board of education has accepted the fire commissioner's recommendation that it is of first importance to protect the present exit facilities from the spread of fire, so that the children will have insured to them a dependable way of leaving the building without danger of being cut off by flames.

The findings made by Commissioner Adamson, based upon the inspection of the special board appointed by him, were as follows:

1. It is not a fact, as charged, that

Digitized by Google

every public school building in the city is a firetrap. Inspection of 203 schools showed that bad fire conditions, due to careless housekeeping, existed in many schools, and that in numerous schools considerable wooden construction should be removed and the lines of exit better safeguarded, but no ground was found which would justify the sweeping characterization of all the schools as unsafe.

2. It is true, as stated, that wooden coverings are used to protect the steam-pipes in the cellars of many schools, a practice believed to be unsafe in a building housing sometimes as many as 5,000 children, and the removal of these wooden coverings is provided for in the new school safety standards jointly adopted by this department and the board of education.

3. In a few schools the main stairs or other stairs are wooden; in a large number the cellar stairs are wooden, without fireproof doors at the ends, and a great number of hallways, through which the children would have to pass in case of fire, contain wooden clothes lockers and wooden supply closets, and wooden doors and non-fireproof windows open on these exit hallways. Provision for the correction of all these conditions is made in the new safety standards.

4. Seven schools were found on our inspections where the conditions required immediate attention, and in all of these cases the conditions were corrected at once, except in the case of the old wooden buildings at Erasmus Hall High School, where the condition cannot be entirely corrected until the wing of the wooden building nearest the new fireproof school building is removed. Part of this wing has been already taken down.

5. Old furniture and books were found stored in the cellars and attics of a number of schools; paints and chemicals were found in a few schools to be kept in wooden closets; in quite a number of schools proper metal receptacles were not provided for the storage of waste and rubbish, and in some schools where carpentry shops are operated, those in charge were found to be careless in disposing of shavings, sawdust, etc.

6. Fire prevention orders, issued more than two years ago, are outstanding against 401 schools. The orders contain 1,145 items, 337 of which have been complied with and 808 remain uncomplied with. Some of the items call for important structural work, such as the protection of stairways, particularly cellar stairways, while others call only for the installation of fire appliances and minor alterations.

7. All of these orders have been made to conform to the new safety standards. Some have been modified and rescinded in accordance with such standards, and steps are being taken by the board of education to comply as soon as funds can be obtained with all of the items not rescinded. The board of education has spent about $1,900,000 for fire protection in the schools since 1908, and since November, 1912, has installed 854 fire extinguishers in the schools. The greater part of the first sum has been spent for fireproof stairways, and the work of removing wooden stairways and substituting fireproof stairways is provided for in the new standards.

8. The fire drills in the schools are excellent, except for the lack of uniformity, and the new rules provide for uniformity in drills in all schools.

RECOMMENDATIONS

1. That the work of fire protection in the schools as provided in the new safety standards be completed by the board of education.

2. That provision be made by the board of education for a supervising fire prevention janitor, whose duty it shall be to make constant inspections of the schools and see that the safety standards are observed in every school building.

Digitized by Google

Safety in Southern Cotton Mills

By G. D. Bragdon

General Accountant, Fire & Life Assurance Company, Philadelphia.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

IN the beginning we have a type of labor in the South altogether different from that found in the Northern mills. The idea seems to prevail in the North that the labor in the cotton mills in the South is all colored help, but this is not true. Outside of the opening and picking rooms, there is very little colored help used. The labor is all native born Americans, while, so far as education compares, they are practically on a par with the labor found in the Northern mills. One advantage I find you have in the North with your foreign labor is that when a foreigner sees a sign denoting a danger point or forbidding the use of a machine it is considered a law, while we Americans have never been taught with the strict military discipline that they receive in foreign countries. Therefore, we pay no attention to these signs.

With the exception of some of the smaller mills that are scattered throughout the South the mills are large, well designed, and up-to-date, and compare with the best mills of other sections of the country.

As there are no factory laws in North or South Carolina requiring the machinery to be guarded, and the manufacturers of cotton-mill machinery had done nothing along these lines, we were confronted on our first inspection of these mills with a large mass of recommendations to safeguard the machinery.

CARDS AND PICKERS

Several of the items that should be called to the attention of the manufacturers of cotton-mill machinery are belt shifters on the cards, and beater locks on the pickers. We find that a great many of our accidents are on these machines. Among the many accidents that I recall on cards was one man who had been working around cards for 15 years trying to demonstrate to a fellow employe how he could shift a belt on a card with his foot; the result was the man was carried up over the shafting and killed. Another case was caused by a spark striking in a machine. The man threw the belt off and then thrust his hand between the belt and grasped the tight pulley to stop the machine; he was thrown against a column some distance from the machine and the final result was a fractured skull. I could recite many instances where men have been injured on these cards, due to their own carelessness.

One danger point which has been hard to get some manufacturers to see is the space between the ends of their spinning frames. Sometimes these frames have yokes on the outside end, but we find a great many of these shaft ends projecting through the end of the bearing with a hexagon nut. As a rule these frames are from 6 to 14 inches apart, at the bearing, bringing the belts anywhere from 9 to 24 inches apart. It can be readily seen that the small girl or woman usually employed on these machines runs some considerable danger in passing rapidly around and between them.

ELEVATORS IN COTTON MILLS

One hazard that we have to contend with is the elevators in the cotton mills. The elevator hoistways are guarded by trap doors, and usually are located in such a position in the mill that the hoistway or doors are used for a passageway. The elevator cables we find, as a rule, receive but little attention from the mechanics in the mills. Some cables we find with as many as 17 out of the 19 wires broken in a strand. Of course, you all know that in ordinary elevator practice from 7 to 9 broken wires is the limit in any cable.

In speaking about cotton mills, probably the first thing that is brought to a Northerner's attention, or that he thinks about, is the child labor situation. This situation is not as bad as some people would have us believe; in fact, not as

Digitized by Google

bad as the breaker boys in the coal mines. We find where both of the parents of the children are employed in the mill that the children are allowed to go into the mill and visit with their parents. Sometimes, to assist their parents, children will pick bobbins, quills, or similar little things; hence the impression that these children are employed in the mill.

In certain sections of the Carolinas the mills receive their power from high-tension lines. This power is transformed from a high voltage down to from 220 to 600 volts. We have received many reports of accidents where employes not familiar with electricity have endeavored to repair or adjust electrical machinery.

We find in some mills that a machinist or foreman of the spinning-room will take off the end of a frame to make repairs to the gears and fail to put the cover back. The danger increases twofold as the cotton and lint will rapidly collect on the grease covered gears. Instead of stopping the machine and cleaning the gears, some one in a leisure moment will try to pick the waste out of the gears. The result is another file in our claim department. Invariably, in a case of this kind, the injured will claim that the proper brushes were not furnished to clean the gears.

The Supreme Court of North Carolina has held that a jury may find that it is negligence for an employer not to furnish brushes for the cleaning of moving machinery.

Another danger point we find throughout the spinning and weaving rooms is bobbins and quills lying about the floor. In the past six months four accidents of this nature have been brought to my attention. The claim generally made in this case is of bad flooring, which, in the majority of cases is untrue—simply a lack of supervision by the foreman of the department.

Speaking of foremen, I wish to recite an instance that came to my attention last spring. We had written one man about safeguarding his mill. I gave him the address of several mills who have done much in safeguarding their machinery. He went to one mill and instead of seeing the general superintendent, one of the most up-to-date and progressive men in the South, and a pioneer in the safety movement, the gentleman went into the mill and inquired of some of the foremen and overseers how they liked the safeguards that had been installed. He was told that they did not like them, and the first opportunity that they had they would remove them. The man went back to his own mill and it has taken us some time to try to convert him to the safety movement.

EDUCATING EMPLOYES

The peculiar nature of the Southern cotton mills' employes makes it very hard to enforce any set of rules that may be posted in a factory. We find that the overseers and foremen of the plants have been known to their fellow employes since they were children and any orders to do any work in a way different from that which they have been accustomed to do would be looked upon as a curtailment of their rights.

Several of the mills have started with welfare work, which may be considered a near relative to "Safety First." One that I have knowledge of spends considerable money every year offering prizes for the finest gardens. Several of the larger mills have schools where children of the employes attend, and here is where "Safety First" should start. Time should be set aside for addresses, lectures, and moving pictures to teach the children how to protect their lives and limbs. While they are not confronted with the street traffic, trolleys, and automobiles of a large city, yet, eventually, they will seek employment in the mill, where they will have to contend with rapidly revolving machinery for 10 hours out of every 24. If the safety idea is instilled into their young minds we will not have the trouble of trying to educate them after they have grown up.

Digitized by Google

Welfare Work

By E. E. Bach

Mine Safety Director, Ellsworth Collieries Company, Ellsworth, Pa.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

WHETHER or not a man shall do an honest day's work is as much a psychological condition as it is a matter of physical strength or skill. His attitude toward his work each morning is determined, to a large degree, by the environment of his home, and whether this attitude, good or bad, obtains the day through will depend entirely upon the one fact as to whether the corporation which employs him does or does not differentiate between the mechanical factor and the human factor in industry.

To be more specific in statement, I would say that welfare work should be of the sort that influences the life of a workman in such a manner as to establish a co-operative interest in his work, foster within him a spirit of contentment in his home, and lead him to so employ his leisure time as not to lower his efficiency as a workman, destroy his domestic happiness, or endanger his standing in the community as a citizen.

Any definite work to be attempted must be determined by the type of the community, the character of the population, the predominating industries, the attitude of the officials of those industries toward the work, and the final end or purpose in view. Where the population is polyglot in character, a wholesome regard for the customs and institutions held sacred by the non-English speaking people must be maintained, and this without doing violence to the sacred traditions and principles which are fundamental to this republic.

The manner of approaching the work and the medium through which it may be done will vary with the needs of the community and the ideals and vision of those held responsible for its development, but it must be non-sectarian, institutional, and of such importance as to command the respect of the community. Whatever the institution, its influence must reach the men, women and children, and be capable of projecting itself into the home.

The object of the work should not be paternalistic, selfish, nor mercenary, but rather philanthropically patriotic in a broad sense. There should ever be borne in mind a composite of community influences against which a constant check of a corrective character should be made, in order that a healthy, moral tone may be maintained, with the idea of strengthening the moral fiber of the nation. Just as numberless tiny strands are woven and interwoven into a great cable of strength, so is a great nation builded from the numberless communities which compose it, and when communities degenerate morally, the nation decays.

WELFARE WORK OF COLLIERIES COMPANY

In the time which remains, I am to illustrate by citing the welfare work being done by my company, along the lines indicated.

The two mining towns of Ellsworth and Cokeburg are situated in the heart of the great Pittsburgh coal district. The combined population is about 5,000 people; the employes number between 2,200 and 2,500, and the school population nearly 1,000. The company has always maintained a defined style of architecture; the houses are electrically lighted and comfortable beyond the common conception of housing. Labor is organized, work plentiful, the daily production being about 9,000 tons of coal and 1,000 tons of coke. Both Protestant and Catholic religions support a pastor, and worship in beautifully designed edifices. No drinking club, licensed saloon or "speakeasy" can be found in either town. There is a preponderance of foreign population, with each group bringing from its own section and province its habits, customs and ideals. Crossing the Atlantic has forever eliminated what was formerly the insurmountable barrier of class dis-

Digitized by Google

tinction, and the immigrant has automatically been raised from the servile state of peasantry to the sublime state of a freedman. His ideas of freedom, justice and liberty are born of his own bitter personal experience, accentuated by hundreds of years of ancestry which has held only a servile relationship to society and government. He is ignorant of the language in which he is to receive his instructions and transact his business, and the smattering of knowledge which he is to get of its meaning will be empirical. He is separated from his home, and all the tender associations which hold a man to his highest ideals.

Lack of social centers and the favorite pastimes of his home land, drive him to the drinking saloon, drinking club or "speak-easy," in all of which he can receive plenty of enlightenment upon the question of personal liberty and kindred subjects. This is not an overdrawn picture, but presents a mere glimpse of the real conditions which actually exist and must be met, and represents but the foreign side of the problem, which, when taken with the native born side of the proposition forms a complexity of human relationships difficult of solution.

Welfare work, in order to be of a permanent nature or lasting in character, must be founded upon the bedrock of education, and where the public school system can be closely allied with the movement, results in the main will be more satisfactory.

The welfare propaganda of the company is educational in character; the public school building forms the center for the greater part of the work.

For the children there have been provided playgrounds, used in connection with the schools, kindergartens, a regular 8-year work in the grades, and a 4-year high school course; special instruction in the household arts for the girls, instruction in the manual arts for the boys, and individual instruction in instrumental music for both.

Night schools are maintained and supported by the company for the purpose of affording an opportunity to those who desire to advance themselves through self-improvement. Classes in mining technology, State mining law, common branches, shop work and stenography have been established for men and employed boys. This instruction is intended to prepare students to secure certificates from the State mining department and to take up different phases of mining work.

For foreign married women, classes are conducted in cutting, sewing and fitting. Employed girls are given instruction in cooking and the general duties of home-making.

Classes in English for employes of foreign birth have for their final purpose the idea of Americanization. Fifty students took out their "first papers" in naturalization at the close of last year's work.

The playgrounds afford recreation in tennis, volley ball, hand ball, and basket ball for both children and older people.

Community temperance work is being done directly by a foreign settlement worker, who speaks directly to the men, women and children upon the use and abuse of intoxicating liquors. A plan for the distribution of beer, with the idea of regulation, is now being tried out.

A well organized mine safety department is maintained throughout the year, and certificates of attainment are granted to those successful in examination. Through a co-operative arrangement, safety instruction is given throughout the schools.

Free moving pictures on general educational subjects are shown frequently.

Instruction in caring for the health is emphasized through medical examinations, oral hygiene, and frequent biological tests of drinking water. An equivalent of certified milk is supplied through the company dairy at the same cost as that which obtains among the ordinary dairymen.

WORK IS UNSELFISH

The general end and purpose of the work may be said to be selfish to the degree of attracting reliable workmen, but it is unselfish to the degree of giving every man, woman and child an opportunity for self-improvement, wholesome recreation, steady employment, housing conditions above the ordinary, and superior school advantages.

Digitized by Google

Metal Mine Accidents and Their Prevention

By Professor F. W. Sperr

Michigan College of Mines, Houghton, Mich.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

IN the consideration of accidents, their causes, and their prevention, two essentially different elements enter into the account—the material elements and the human or psychological element. The first is largely subject to the control of the engineer according to well-known laws. If a mining method is, or becomes, unsafe, a safer and better one is evolved. Much has been accomplished in this last respect in the last 20 years; the most notable progress being in the displacement of the large, open or timbered, stope by the filled or caved stope. Backfilling with sand, distributed in the stopes through pipes with compressed air, may be mentioned as one of the later successes in filling stopes which can not be caved. If stopes can be caved or filled so closely following the excavation that there is barely room enough for the passage of men and material, large pieces of rock have nowhere to fall, the loosening of small pieces can be more closely watched and taken care of, and the large percentage of accidents, which our statistics show as due to fall of rock or ore from roof or wall, will be greatly reduced.

EDUCATING THE MAN

The human element, on the other hand, is less easily controlled, more complex, and less perfectly understood. A large percentage of all accidents is attributed to the carelessness of the victims themselves. But, what is carelessness? And why are men careless?

Many of the accidents that are commonly attributed to carelessness are due to the momentary distraction of the attention, or to the absorption of the whole attention by something else than the presence of danger. We can educate, discipline, give the best possible supervision, etc., in addition to placing all possible material safeguards, and, thereby, no doubt, avoid many accidents, but the fact remains that such accidents take their proportionate toll from the best educated and from those whose office it is to discipline and supervise.

Let us consider a few cases only: The general consulting engineer of a large corporation was inspecting a shaft. Standing on the sollar of a lower level, he leaned forward into the shaft to make an upward observation. The skip was being loaded below in the same compartment of the shaft. He had every opportunity to observe the position of the skip and note its starting upward by the rope hanging in front of him. He was not inattentive to what he was about, but he was overattentive to the work in hand—and the skip caught him.

A mining captain of lifelong experience noted something in the skipway that required adjusting which would take but a moment of his time in passing to make right. He proceeded to remedy the defect. The skip came along and took him for eternity. Probably the set purpose to accomplish the act initiated prevented his getting out of the way of danger.

The manner in which the influence of the set purpose to accomplish an initiated action may become all-absorbing and complete-controlling, is well illustrated by the experience of one of a surveying party. He set out to pick up a pin that was stuck in the middle of a railroad track on which a cut of cars was coming down the grade towards him. At first the necessity for making haste did not appear to him, but it soon grew upon his consciousness, and he ran at topmost speed, unmindful of the calls of his fellows to get off the track, losing all sense of danger, his sole thought being to get that pin, which he did and jumped to one side with scarcely six inches to spare between himself and the passing car.

Digitized by Google

A mine surveyor's assistant, going in advance of the party, carefully picked his way around a hole in the passageway. A short distance beyond he was stopped by the call of his chief and asked to return; in returning he walked into the hole—apparently having forgotten all about its being there. In reality, it was the new train of thought aroused by the summons that obliterated all thought of the danger in his path.

Many apparently careless acts are rather due to miscalculation or misjudgment. A timberman going out to shaft, through a drift, lost his light and had used his last match. He started to grope his way to the shaft, carefully reaching ahead with the advanced foot to avoid stepping into the shaft. Presently a light flashed around a pillar and he found himself with one foot close to the edge of the shaft and with the other reaching far out into the opening. He recovered himself. But could he have done so if the light had not appeared?

DUE TO MISCALCULATION

A case of accident due to miscalculation was that of a mining engineer who was making an examination of a mine in Mexico. He lost his light when alone in a drift and some distance from a shaft, and his last match gone. The shaft was of the Spanish regime, 75 feet in diameter, walled with masonry to a depth of about 1,000 feet, with no framework, absolutely clear of everything, except some guide ropes which had been placed during the English regime for little hoists around the immense opening at surface. The man started for the shaft, but, before he saw the light, he fell headlong into a shaft—by chance against one of the guide ropes, which he grasped, sliding 200 feet down to a cage landing, and shouting for help.

Men do many hazardous things which are forbidden by the rules of the mine, not from carelessness, but for a reason which outweighs the element of danger in their estimation. They ride the skips, because of convenience; ride the bail, because they feel safer there than in the bottom of the skip; jump on the cage after the signal to hoist has been given, because they are in a hurry to get to the surface; fail to make their working places safe, because they persuade themselves that the extra effort required is unnecessary. Such violations can be minimized, but never wholly eliminated by education and discipline.

DUE TO NEGLIGENCE

There is another class of violations of rules which is due altogether to negligence. Leaving fences down, gates open, covers off, and failure in general to apply the prevention means which are provided. This class requires special treatment, supplementary to the education and discipline to be subscribed for the first class. A system of charges for damages on account of the improper use of material things about the premises seems to be most effective in producing the desired results.

Then there are those who take chances for the very pleasure of the excitement which the action affords. The greatest sinners in this regard are the athletes whose co-ordination of action between eye and muscle is most perfect. They can place the hand and foot with precision on objects passing at the rate of 10 to 15 miles per hour—the greater the speed the greater the pleasure of the experience. The awkward, clumsy fellow takes no such chances, because they give him no pleasure. And yet the athletic quality is highly desirable and often saves life, but, like many other good qualities, it needs to be controlled, not used in foolhardy display.

It is no longer the fashion to find consolation in the reflection that we shall always have accidents, but all are alive to the questions of the best means to prevent accidents and to the importance of rescue, first aid, and the best possible medical treatment for those accidents that happen in spite of us, and there is reason to believe that greater results are yet to be attained through the systematic study of the human element involved in the problem. It is not enough to say men are careless, but it is necessary to go back of that and find out why, if possible, in order that the proper correctives may be applied.

Digitized by Google

Street Traffic Regulation in Relation to Public Safety

By W. P. Eno

International Traffic Expert, Saugatuck, Conn.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

STANDARDIZED street traffic regulations intelligently enforced by the police and education in them of both pedestrians and drivers through the plentiful distribution of folders and posters is the keynote of safety on public highways.

After 16 years devoted to the development of traffic regulation in Europe and America, I now feel qualified to recommend definite action.

I want to emphasize right here, in the strongest possible language, that not only should there be no new specific traffic laws or ordinances anywhere, but that all existing laws or ordinances on the subject of street traffic everywhere should be promptly repealed and in their place each city or town should cause to be enacted, through ordinance, city charter, or both, the following simply worded statute, which it is hoped may later become a State, then a national, and finally an international law:

"The police department (or in towns which have no police departments, the board of selectmen, town managers, or other proper authorities) is hereby authorized, empowered and ordered:

"To adopt and enforce the standard police street traffic regulations and to direct, control, and regulate, and, when necessary, temporarily divert or exclude (in the interest of public safety, health and convenience) the movement of pedestrian, animal and vehicular traffic of every kind in streets, roads, parks, and on bridges."

The New York regulations have been the basis of all other sets officially adopted or proposed. They date from October 30, 1903, and each revision has shown progressive improvement. They were given official standing in Paris, July 10, 1912. Following this, London also codified similar regulations, so that now the New York police street traffic regulations are practically identical in the most important cities of the world.

All policemen should be made to understand that they have general street traffic obligations by the following general order issued by every police department:

"You are hereby informed that it is the duty of every policeman to correct and instruct drivers in the traffic regulations and reprimand them for infractions thereof, and if an offense is committed with intent to block traffic or to interfere with the rights or safety of others, to take the driver's name, number, and address, the vehicle number, if it has one, and such other particulars as may be available for identification and report same at his precinct for action. In case of a serious or intentional offense, the driver should forthwith be arrested."

The head of the bureau of street traffic should be fitted by experience and essentially by natural talent for traffic work. The money saving which a competent man at the head of this bureau could effect for any city is very large, not to mention the saving of life and the reduction in the number of accidents. Even in towns with but a small police force the regulation of traffic should be delegated to a special officer.

Street traffic regulation has become the most important branch of police work, from an economic standpoint at least. Even in its present development the amount of money it saves the people of New York yearly, for instance, far exceeds the cost of maintenance of the whole police department.

STANDARDIZATION OF TRAFFIC SIGNS

Traffic signs should be uniform in shape and color and brief in wording.

Digitized by Google

Those for warning and directing the movement of traffic, vivid yellow letters or arrows on a black background. Those for designating public parking spaces, cab stands, car and bus stops, etc., should have the colors reversed, *i. e.*, black on yellow. These colors contrast best of all in the day time and when illuminated at night.

Besides the foregoing, all of which may be termed "general street traffic regulation," there is "special street traffic regulation" consisting of: (*a*) "The Block System"; (*b*) "The Rotary System"; (*c*) "One-Way Traffic"; (*d*) "Parking and Ranking"; (e) "Street Car and Bus Stop," etc. Time will not permit going into details. I wish, however, to state that I believe the rotary system will very largely supplant the block system at street intersections; that "isles of safety" will come to be used as extensively in this country as they are abroad and that one-way traffic streets will solve many more problems.

EXAMINATION FOR ALL MOTOR DRIVERS

Another provision absolutely necessary for safety is the examination of all drivers of motors before properly appointed and competent officials.

In conclusion, I would say that in accomplishing what has already been done in New York the greatest difficulties encountered have been in gaining the hearty co-operation of police officials, who have been often more prone to prevent than to promote.

The Prevention of Accidents

By R. C. Richards

Chairman, Central Safety Committee, Chicago & North Western Ry.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

IN order to secure safety in carrying on the business of a railroad, it was first necessary to furnish safe tracks, engines, cars, structures and safety devices, such as automatic signals, interlocking apparatus, and similar devices that experience had demonstrated were practicable, and employ and properly instruct competent men to operate the railroad and maintain it; then rules were prepared and published providing for the safe operation of the railroad.

The enforcement of such rules was attempted by the administration of discipline to employes failing to observe them, but unfortunately, the number of accidents increased in much greater ratio than the increase in business, causing so many deaths and so many cripples that a public demand arose for the enactment of laws making the employer liable for all kinds of accidents, regardless of their cause, on the theory that if the employer were made liable for damages he would operate his railroad or plant with greater care and the number of accidents would be reduced.

THOUSANDS KILLED AND A MILLION INJURED

If I were a word painter, as a man should be who has for discussion such a subject as this, and could visualize to you, to every working man and his family, to every employer and the public, what these statistics mean of thousands of working men killed and over a million injured every year; the suffering, privation, and often destitution, as well as loss of efficiency in carrying on our industries; the loss to the community that follows in the wake of these thousands of funerals and the vast army of cripples and injured, we could secure the active help of all the workmen, employers, and the public in the movement for the conservation of human life and limb, now commonly known as "Safety First," which is not a question of dollars and cents, but a question of saving human life—the most valuable thing in the world—which when once gone, can never be brought back.

Digitized by Google

ACCIDENTS ON RAILROADS

Accidents on railroads are generally classified under three headings:

1. Accidents resulting in death and injury to passengers.
2. Accidents resulting in death and injury to outsiders.
3. Accidents resulting in death and injury to employes.

The only accidents that can now be materially reduced on the railways without the active assistance of the public are those resulting in death and injury to employes, and I shall, therefore, devote most of this paper to methods of prevention of such accidents.

WHAT THE SAFETY MOVEMENT MUST DO

Admitting, for the sake of argument, that the "Safety First" movement was started for a selfish purpose and to save dollars, everyone must realize that before any saving in money can be made, the movement must

1. Save life and limb.
2. Prevent pain, suffering, sorrow and destitution.
3. Prevent making widows and orphans.
4. Bring men home well and sound at the end of their run or day's work.
5. Make operations safer and more regular.

If, after accomplishing those results, the movement also saves dollars so that there is more money with which to pay wages, make improvements, install more safety devices, buy better cars and engines, pay dividends and interest, surely no one can complain or criticise the movement because it also saves dollars and cents.

STATISTICS OF THE NORTH WESTERN

The statistics of the North Western Railway show that 83 per cent of the employes killed and 82 per cent of the employes injured are killed or injured in accidents brought about by dangerous, careless, or thoughtless practices, while only about 7 per cent of the employes killed and 6 per cent of the employes injured are killed or injured by reason of obstructions, of defective cars, tracks, engines, tools, machinery and other defective things.

The Interstate Commerce Commission statistics show that five out of every six of the employes killed on the railroads of the United States, and nine out of every ten injured, are killed and injured in little accidents which would take less time to prevent than it does to report; the other one killed and the one injured are killed or injured in big accidents, such as collisions and derailments. Accidents are not inevitable, as many formerly thought, but most of them are avoidable. If we could wipe out the little accidents and those caused from careless or thoughtless practices, we would probably put an end to the accident business and our troubles would be over.

PREVENTION OF ACCIDENTS

Prevention of accidents has been and can be helped along by holding public safety meetings and safety committee meetings, by making men understand, that when they come to these committee meetings, that they do not come as brakemen, conductors, firemen, engineers, agents, foremen, laborers, or superintendents, but as committeemen; that they all stand on the same footing and that the meeting is held for the purpose of giving every man an opportunity to present in his own way without fear of criticism, his ideas and opinions as to how we can best secure safety.

Have safety committeemen investigate accidents that occur in their jurisdiction and post their findings on the bulletin boards where any one can read them if he desires to; furnish annual and monthly report of accidents and their causes to members of the safety committees and post them on the bulletin boards.

Impress upon all members of the safety committees the importance of teaching new men, by precept and example, how to do the work safely and not take unnecessary chances; and educate the foremen and little bosses that "Safety First" means not only greater safety in operation, fewer deaths and injuries, but greater efficiency and economy in operation, as well as regular and greater dispatch in the movement of trains and in the operation of plants.

The work of prevention of accidents on railroads along the lines above indicated or on some similar lines, has been

Digitized by Google

going on since May, 1910, and its usefulness must be judged by results as that is the only method by which any plan can be judged. The Interstate Commerce Commission reports for the years ending June 30, 1910, and 1915, tell us these results were as follows:

	Passengers		Employes	
	Kil'd	Inj'd	Kil'd	Inj'd
1910	450	15,515	3,418	68,925
1915	222	12,110	1,809	38,900
Decrease	228	3,405	1,609	30,025
	50.7%	21.9%	47.1%	43.6%

In this statement I have included only the employes killed and injured in train operation, as in 1910 reports were not made to the commission of employes killed and injured in industrial accidents, so no figures for comparison are available. The percentage of reduction of injuries and deaths on some lines with Safety First organizations has been larger than these figures show, but it seems fairer to take the general results all over the country than to limit the statistics to some of the lines that show the best results.

The work of prevention has also shown a very gratifying result in the matter of:

1. Cleaning up obstructions in yards, stations, platforms, shops and roundhouses.
2. Installing additional light and securing better working conditions.
3. Putting up signs, guards and railings at dangerous places.
4. Covering gearing, belts and movable parts of machines.
5. Blocking frogs and guard rails.
6. Putting a stop to dangerous practices and customs.
7. Better inspection and repair of engines, cars, tracks, tools, machines, and
8. Especially in interesting employes in the matter of the prevention of accidents and bringing home to them a personal responsibility for the continuance of dangerous conditions and practices, and a realization of the fact that the greatest risk they run is the risk of being killed or injured by some reckless devil who should be driven out of the service or quarantined just as we now quarantine smallpox, scarlet fever, diphtheria or other contagious diseases.

TRAVELERS ON THE HIGHWAY

The prevention of accidents at highway crossings resulting in death and injury to pedestrians and occupants of vehicles, especially automobiles, has become a very important matter.

If there were any way of bringing home to travelers on the highway the fact that all they have to do to prevent an accident at a highway crossing, no matter how obscure or dangerous it may be, is to STOP, LOOK and LISTEN, and that their lives and limbs should be valuable enough to them to take that simple precaution, which would not take over a quarter of a minute, perhaps something more in the way of prevention could be accomplished.

TRESPASSERS

I have said nothing about the prevention of accidents to trespassers which, during the last 26 years have brought about 118,654 deaths and 130,059 injuries—66 per cent of which were to citizens of the locality in which the accident occurred—mostly wage earners; 14 per cent were children under 18 years of age, and 20 per cent tramps, because the subject is so familiar to every one and because nothing much can be done to eliminate such accidents until we have legislation penalizing such practices.

THE NATIONAL SAFETY COUNCIL

Too much cannot be said about the work of the National Safety Council in assisting in bringing before the public the necessity of doing something, not only to prevent death and injury to the men engaged in carrying on the work of transportation, but also in calling attention to the necessity of doing something by the public to prevent death and injury to travelers on the highway and to trespassers.

COST TO RAILROADS

In the Middle West, the average cost of railroad accidents, counting the death cases, serious and permanent injuries, as well as slight injuries, and including the cost of caring for the injured, is about $115 per case, so that every time we prevent an accident, we save $115. In the six years and three months that the safety organization has been in existence on the

Digitized by Google

Chicago & North Western Railway, up to September 1, 1916, with an increase in earnings and of nearly 450 additional miles of railroad, we had 547 fewer fatalities and 16,591 fewer injuries. Any one can figure the saving in dollars and cents. At the time the movement started the accidents were increasing by leaps and bounds—now they are decreasing. "Safety First" was started to save lives and increase safety and regularity in operation; to improve working conditions; to create better feeling between the officers and men, to save dollars and to bring home to the men that it is better to cause a delay than an accident.

GETTING THE RIGHT MEN

It is now, and probably always will be, the men on a railroad who will make or break it, and it seems to me, that in all the work along the line of preventing accidents we have not yet attacked one of the primary causes of a large proportion of avoidable accidents, the employment of unfit men, and that we should bend our energies to securing the adoption of some plan for the selection and employment of fit men, mentally and morally as well as physically, to operate the railroad safely and economically.

While much has been accomplished along this line by the supervising officers and the safety organization, there still remains, I think, much to be done. When we exercise the same care in selecting, educating and supervising new men that we do in designing, selecting, and installing new machines, bridges, structures, cars and engines, we will have taken a great step toward the prevention of avoidable accidents.

Railroad Accident Prevention

By Marcus A. Dow, Chairman

General Safety Agent, New York Central Lines, New York City.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

WE are gathered here for the purpose of exchanging ideas as to the most effective means of getting concrete results in accident prevention, and we shall profit by one another's experiences, to the end that this great work on the railroads of this country shall go on with a greater impetus, creating new and gratifying records of life saving, dispelling the illusion that a railroad man's work must necessarily be hazardous, and building up a wonderful, enduring structure of safety upon the firm foundation of a cultivated carefulness.

A convincing proof of the safety and efficiency of modern railroad operation is the fact that passengers on the trains of American railroads are practically immune from death or serious injury. During the last year covered by Interstate Commerce Commission figures only one passenger lost his life in a train accident on the railroads of this country, out of every 11,000,000 passengers transported, regardless of the distance they were carried. The wonder of this achievement increases when we consider the fact that in the city of New York there are, ordinarily, each year, 500 human beings killed by moving vehicles in the city streets, and this city has a population of less than one-half the number of persons carried on railroad trains to one person killed. This high state of efficiency in railroad operation is further accentuated by the fact that in that same year there was but one railroad employe killed in a train accident for each 100 loaded freight cars transported a distance equal to 17½ times around the world, or as far as from the earth to the moon and half way back again.

INDIVIDUAL TRAGEDIES

We have found, upon analyzing our

Digitized by Google

accident record, that only 10 per cent of injuries to the more than 100,000 railroad employes in the country each year were in so-called train accidents, and that the other 90 per cent met their fate in accidents in which the human element was the principal contributing factor.

We accept with credulous wonder the statement based on statistics that in the vast industrial area of these United States there is a workman killed every 15 minutes out of every hour out of every day in the year, and that a workman is injured every 16 seconds out of every minute out of every hour of every day in the year. And, as we contemplate the vastness of this waste of human life, we seem to see scattered over this "Land of the Free" the bones of a million once sturdy men, whose blood has been spilled in industrial accidents —a ghastly protest against the ignorance, or the incompetence, or the indifference, or whatever it was, of those whose duty it should have been to try to prevent.

EDUCATING THE INDIVIDUAL

Our effort in the past has been, and must necessarily continue to be, toward educating the human individual of the great rank and file to so conduct himself as to make safe his daily occupation, but I would like to implant in your minds the seed of this one thought: It is not upon the rank-and-file employe that the duty of his own safety and that of his fellow employes most heavily rests. Upon whom, then, does the duty of accident prevention rest? Perhaps some of you remember the opera, "Robin Hood." If you do, you will recall "The Armorer's Song," in which there are a few lines running like this:

"The sword is a weapon to conquer fields,
I honor the man who shakes it.
But nought is the lad whom the broad sword wields,
Compared to the man who makes it."

Now the great rank and file of railroad and industrial employes are the ones who must wield the weapons which will destroy those habits and tendencies that are inimical to the safety of themselves and others, but how much more important is the duty of the men who are in charge of those men to make, to forge, and to place into the hearts and minds of the men under them those weapons of knowledge and of practice with which such unsafe habits or tendencies may be successfully overcome.

Any yardmaster, or any foreman, or other person charged with supervision, who will make up his mind that he is going to put a stop to unsafe practices on the part of his men, and who will concentrate his effort in that direction, will seldom, if ever, have an accident among his men, and he will thereby increase the efficiency of his organization, save his company needless expense, and conserve the human material, which his company has entrusted to his careful supervision, just as it entrusted to him the care of its engines, its cars and other inanimate things.

ORGANIZED SAFETY WORK PAYS

That organized and systematically conducted safety educational work pays is clearly manifest in the results that have been attained. Specialized safety work, in the form of a great co-operative and educational movement, was generally adopted on the railroads of the country about five years ago. While safety in railroad operation has steadily improved during the past 20 years, it has taken a most astonishing leap toward perfection since this movement was launched.

In closing, I wish to congratulate the representatives of the railroads here assembled upon the wonderful achievements you have made.

May you hook your spurs in the broncho "Determination" and ride with steady, swinging lope across the range of things that are possible of attainment. Forget your failures, if failures you have had. Look up and see the rainbow smile—that beautiful rainbow of hope, beyond which lies the realm of ultimate success—a success, which in this work, is measured not by mere financial gain, but by all that is good in life. Success that is measured by the happiness of the home and by the comforts of those left undisturbed by any act of carelessness or neglect.

Digitized by Google

American Museum of Safety

ARTHUR H. YOUNG, who for some years has been supervisor of Labor and Safety of the Illinois Steel Company, Chicago, will take up his new duties as director of the American Museum of Safety, New York, on January 1, 1917.

The American Museum of Safety is dedicated to the lofty ideal of conservation of human life in industry. Thoughtful America today stands appalled at the stupendous sacrifice of life and limb in our industries. To conserve our great national asset, industrial labor should receive the hearty support of every good citizen. The efficiency and almost limitless resources of industrial America are today placing this country in an impressive position before the world. The increase in production in many of our leading industries during the past year has passed far beyond all conservative estimates.

ARTHUR H. YOUNG

Director American Museum of Safety. Mr. Young assumes office January 1, 1917

The industrial worker is the fundamental fact. It is he, multiplied by millions, who is responsible for the vast output of American products now reaching the markets of the world, in addition to supplying an enormous home demand.

It is with the safety and the welfare of the industrial worker that the American Museum of Safety is concerned. To safeguard him against injury in the factory, to protect him against unhealthy conditions, to see that he and his family are properly housed, and to encourage factory cleanliness, efficient first aid service, good lighting and ventilation, are some of the subjects which are part of the modern industrial safety and betterment campaigns in which the American Museum of Safety is deeply interested.

In order to accomplish its great mission the trustees of the American Museum of Safety have selected Mr. Young as director. He comes to the American Museum of Safety with a high record for successful achievement. A man's highest testimonial is himself. No words that others can speak can equal a man's own self-accomplishment. The record of results measures a man with unerring certainty.

Arthur H. Young started his business career at the age of 13 as a messenger boy in the company of which he is now supervisor of labor and safety. Step by step he went up the ladder as leverman, assistant in the chemical laboratory, timekeeper, pay-roll clerk, statistician, assistant supervisor of labor and supervisor of labor and safety, having charge

Digitized by Google

of all the plants of the Illinois Steel Company in its activities in accident prevention, personal injury settlements, employment, fire, police, plant cleanliness, sanitation, plant restaurants, visiting nurses, and other welfare matters, including pensions. In addition, his duties included the administration of discipline and review of all cases of discharge by superintendents and foremen, all complaints of improper working conditions or equipment, with full power to make any necessary adjustments. The department under Mr. Young's charge strove by every honorable means to bring about the closest contact between the officials and the men working in the plants.

Many other large industrial institutions have organized their labor and safety departments along the lines of the Illinois Steel Company. The U. S. Government, State factory inspection bureaus and many industrial concerns have used the safety campaigns of the Illinois Steel Company as models in organization detail.

Mr. Young has been an earnest and enthusiastic member of the National Safety Council since its foundation. He is held in high regard as one of the leading men in the industrial safety field. The directorship of the American Museum of Safety offers a splendid opportunity for Mr. Young's ability and experience to render valuable aid to industrial safety progress.

Safety in Bessemer Operations

By J. H. Ayres

Superintendent of Safety, Sanitation and Welfare, National Tube Company, McKeesport, Pa.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

SOME three score and ten years ago a man conceived the process of "purifying iron with air," a somewhat wild and chimerical idea, but, nevertheless, like all inventions, an idea that to the most practical was a vision and a dream. However, this genius stuck to his claims and after ten years of faithful prosecution of his beliefs achieved success, as history today has recorded, and your process of Bessemer rightfully belongs to one named Kelly.

Having accomplished a fact, the inventor set about to make it commercially a desirable object, and to that end installed a vessel for the conversion according to his ideas, which may now be seen in the main office of the Cambria Steel Company, Johnstown, Pa. As compared with the modern type, it is a toy, and well may we stand in awe as we gaze upon its diminutive size, as the progenitor of a process that ultimately became the dominant factor in the metallurgical world. With the advent of steel by the Bessemer process began the manufacture of it on an extensive scale, and, quite distinctive from the then well-known process of crucible steel, which was applied to tool purposes only, Bessemer for the more general and extensive purposes that iron had been used for before, and, consequently, supplanting it—such as rails, structural material, and other uses involving large tonnages.

As the process was adopted and practiced in the United States for some 50 years, there accompanied it a great sacrifice of human life and limb, and, though you may hardly credit it, in 1906—or just a decade ago—the extent of such destruction had reached the stupendous figures of 423 out of every 1,000 identified with the business were doomed to die or to be injured permanently or partially. Where in history can you find anything parallel to this? We today are appalled by the war in Europe, where so many are involved, yet the other day I saw it recorded where 20 of every thousand engaged

Digitized by Google

are insane, 220 are either killed, maimed, or missing, and this war's record so far as we can learn is not, when put on a percentage basis, equal to the Napoleonic war nor to the Revolutionary war of our own country.

CAUSES OF ACCIDENTS

The men are subject to injury from the following causes:

Asphyxiation, burning gas, exploding gas, hot metal explosives and spills, breakouts, electricity, hot water and steam, nails, splinters, etc.; slips, belts, gears, etc.; cranes, locomotives, switches, flying scale, falling and flying objects, metal in usual motion, metal in unusual motion, handling stock, lifting, handling material in process, piling, loading, etc.; using tools, operating machines, falls, and yard conditions.

The following deductions are made: Sixty-one per cent of the injuries incurred were to those that are commonly termed laborers, and, furthermore, the causes are one-fourth from hot metal explosives and one-third falling and flying material, constituting the major portion of all those engaged in this branch of steel manufacture.

SYSTEMATIC ELIMINATION OF HAZARDS

In many Bessemer works attention has been given to systematic work for the elimination of injuries, serious or otherwise, so that instead of the condition existing prior to 1906, we have an improved state of affairs. Of course there are exceptional works where the injuries are abnormally high, especially one that is today as it was when erected 30 years ago, but in the majority of them changes have been effected that have contributed not only to their output but also to the reduction of hazards to those employed.

As "Safety First" activities are practiced in all steel works today this improvement obtains more or less, and the best results from any one works is that, instead of 35 per cent of the employed being injured, it has been reduced to 5.01 per cent. By what particular means would be hard to say—physical safeguards were installed, the department was thoroughly organized for safety in practice, and a system of education instituted that has brought about these gratifying results, and therefore it seems to your speaker that education, after all, is the dominant factor in reducing the toll on human life and limb.

It hardly comes within the province of this paper to enumerate the many means of a physical character to reduce injuries to workmen in the process, but one I wish to allude to in particular—explosions of hot metal and spills are the principal contributions to injuries; therefore the closed top or bottle-necked mold, as used by many works today, is responsible for the injuries in the above classification. I am not going to discuss the merits or demerits of this type of mold from a metallurgical point of view, but I do emphatically declare that where the open-top mold is used I have no knowledge of any injuries resulting such as are recorded at plants still adhering to the closed-top type of mold, and I know that the plants using the open type of mold apply their product to all the purposes and uses that the product of the closed-top type is applied to, and, furthermore, there is a greater tonnage life of the open-top and corresponding less cost per ton of steel for molds, proving conclusively that it is better and cheaper to subdue erratic metallurgical practice this way than at the expense of human life.

Digitized by Google

Freight Elevators—Their Use and How to Prevent Accidents

By J. H. Wright

Assistant to President, Bryant Paper Company, Kalamazoo, Mich.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

BY the co-operation of mill managers, State factory inspectors and skilled insurance inspectors, much may be done to lessen elevator hazards. The saving of one life, in a decade or longer, would more than recompense any firm for the cash outlay necessary to make the elevators reasonably safe.

Signal bells should be installed, operated by a push button, the latter placed at every floor near the starting lever. Notices should be posted demanding that a signal be sounded an instant before starting the elevator, thus giving anyone on the floors above or below, time to get out of the way.

SAFETY CLAMPS AND GATES

A safety clamp should be installed at every floor, that would lock the starting cable, this to be used by men unloading or loading heavy or fragile materials. The object of this device is, of course, to prevent some thoughtless person from starting the elevator while the load is partly on and partly off. This locking device is easily handled and no doubt is familiar to most of you.

Safety gates should, of course, be installed at every floor opening and a regular inspection made to see that they are in working order. The tying up of these gates without notification to the superintendent or foreman should be made a serious offense.

The cables require constant watching and at regular intervals thorough lubrication.

The use of freight elevators for carrying passengers should, as a general thing, be discouraged or forbidden. One large mill has typewritten notices posted at the elevators, reading as follows: "This elevator is only for the use of those in charge of freight, and the foreman of this department; others must keep off." These notices are neatly framed in glass so they may not be mutilated nor destroyed and are fixed in place by screws.

CARELESSNESS AND CROWDING

The most serious elevator accidents are probably those in which the operator or passengers are caught between the elevator floor and the floor through which the elevator is passing. Many lives have been lost in this manner, usually, of course, through carelessness or crowding. There is a device on the market that will prevent this kind of an accident. It is constructed with steel aprons which are attached underneath the floor on both sides of the elevator opening. The aprons are connected with a cross rod that operates a weight attachment. If any object touches these aprons, no matter how lightly, the elevator instantly stops.

The firm with which I am connected has about 20 elevators thus equipped and we think highly of this automatic stop. But it is a singular thing that some factory managers do not display any particular interest in this device.

Several serious elevator accidents have resulted from material falling down the opening and striking the operator. To prevent this kind of an accident, a cover should be attached to each freight elevator directly over the place where the operator stands.

The greatest factor for safety in operating an elevator is in constantly reminding those who use it of the danger always present. Treat each infringement of the rules as a serious matter and soon the accidents on your elevators will be few.

Digitized by Google

EDITORIAL

Motion Picture Theater Safety

THE National Association of the Motion Picture Industry, a new association whose name explains itself, is giving considerable attention to securing the safest conditions in motion picture theaters. When it is remembered that more than 10,000,000 persons attend motion picture theaters in this country each day, it will be apparent how important it is that these theaters are made as safe as possible against fire and any other contingency which might cause a panic.

A committee on fire prevention regulations and insurance has been named by the association whose duty it is to study the subject carefully and to formulate fire prevention regulations. At a recent meeting this committee approved issuing a series of bulletins to be sent out to every branch of the industry. The first one is to be entitled "Good Housekeeping." The safe storage of films will be carefully considered and means devised for reducing this hazard. Records show that about one-half of the fires in the industry start through poor housekeeping, and this fire prevention campaign is intended to reach every branch of the industry. By this means many of the existing hazards will be eliminated. Such work as this indicates the progressive spirit which exists in the industry and that the motion picture industry is concerned with the safety of those attending motion picture theaters.

A Safety Commissioner

NEW YORK CITY is to be congratulated upon having a police commissioner who believes that the prevention of accidents should be a part of the duties of the police department. Police Commissioner Arthur Woods is setting a splendid example for police commissioners in the earnest and valuable work he is doing in the safety field. Besides the immense amount of work which the head of the New York police department is called upon to perform, Commissioner Woods finds time to attend fire prevention and safety committee meetings, address safety meetings and to issue safety pamphlets and display cards dealing with the prevention of accidents.

Commissioner Woods is distributing through the New York police department a safety pamphlet giving excellent suggestions for those who walk and drive, also precautions against burglars, pickpockets, diseases and other miscellaneous dangers to life and property. The commissioner has also prepared a striking card, 21 by 11 inches, in colors, showing the efficiency of the police department in aiding those injured in automobile accidents. This is splendid work and Commissioner Woods is creating a new and highly valuable era of usefulness in introducing the police department as a factor in accident prevention. His example should be followed by police departments throughout the country, for their help is sadly needed in a campaign to reduce the enormous number of preventable accidents.

Digitized by Google

Police and Fire

By G. W. Atwood

Chief of Police, Youngstown (Ohio) Sheet & Tube Company.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

THE biggest problem of the industrial chief of police is to get men whom he can train into efficient and reliable policemen. In my company, where all hiring is done through the employment bureau, we have laid down the following requirements for police applicants:

They must be over 25 and under 45 years of age, and as near to six feet in height as possible. In addition, we try to secure men weighing between 175 and 200 pounds. At present we have representatives of 16 different nationalities. The applicant must be able to read and write English, and must have a good record, preference being given those having former police experience. After having satisfactorily made out an application card, he is sent to the chief surgeon for examination, and if found physically sound, he is returned to the employment bureau, where he is given a pass to the police department headquarters. Here he is presented to the chief, who carefully goes over the applicant's record, as shown by the employment bureau card.

The chief then informs the applicant that the working hours are from 6 to 6 o'clock on either the day or night turn, and of the opportunities for advancement as all promotions are made from the ranks. Preliminaries having been arranged, he is told to report to the lieutenant on a certain morning or evening.

DUTIES OF PATROLMAN

The following list of patrolman's activities, while far from being complete, will serve to indicate the varied nature of his duties:

1. He must note and report stretchers that are missing, fire equipment found defective, defects in railroad equipment, engines running without lights, railroad crossings blocked, lights that are not burning and should be, or vice versa; time clocks running fast, slow, or that are stopped; time card racks that are unlocked, etc.

2. If, on order of a foreman, he removes any workman from the plant, this must be noted, giving the man's check number, with the reason for his ejection. If he finds men loafing or fooling, he must stop them; or sleeping, must awaken them; in each instance securing the check number of the man or men. When he finds men fighting, he takes the men to their foreman, who decides whether they are to return to work or not. If he finds a man drunk, the latter is without any further question taken from the plant and the foreman notified. If he finds any employe stealing, or attempting to steal, he takes the man to the department superintendent, who disposes of the case. If he finds a man smoking where this is prohibited, he must report it and, of course, put a stop to the smoking. He must, when possible, render aid in case of fire or accidents. When he sees men violating the company's safety or sanitation rules, he must see that the violation is discontinued.

To make sure that the patrolman properly performs his duty, the entire plant is divided into five zones. In each zone are about 25 patrolmen, who are in charge of a sergeant. The lieutenant is charged with a general supervision of the police department in his turn.

PROBLEM OF THE CHIEF

The problem of the industrial chief of police is twofold:

1. The efficient patrolling of the plant proper, which we have just discussed.

2. The problem of the entrance gates. To gain a proper appreciation of all that the problem of the entrance involves, a few figures will perhaps serve best. At our plant we have three main entrances:

The north gate, through which 6,000 men pass in to work daily; the south gate, where about 4,000 pass in; the rod and wire gate, through which about 2,000 men pass.

Digitized by Google

While necessary for efficient patrolling to select the right kind of men, it is of far greater importance to exercise care in selecting men to work on the gates. This can easily be understood when it is borne in mind that 6,000 men pass in at the north gate within two hours, and the gatemen must exclude all those who are not going in to work or who are under the influence of liquor, without unnecessarily delaying men who are on their way to work. They must take the check number of any workmen coming in late or going out early, must stop all workmen coming out with bundles and examine the contents, and must stop and examine vehicles of every description coming in or going out. In addition, all men hired for work must be taken to the proper foreman by a guide, of whom there are five at the north gate. The gateman and his assistant are selected from the police department, men being selected for this work who have been in this department for a number of years as patrolmen and whose record with us warrants us in believing them fitted for the work. This practically covers the police problem.

THE FIRE CHIEF

We will now turn to the problems faced by the industrial fire chief. For convenience the problem can be divided in a broad way into two parts: First, the problem of fire prevention; second, the problem of fire fighting.

The problem of fire prevention is largely one of locating dangerous fire hazards, and then taking adequate steps to provide against same. A few instances of how this is accomplished may be of value.

At our plant we no longer erect permanent wooden buildings, runways, or stairways, but construct them almost entirely of brick, cement or sheet metal. We are, where possible, installing central heating systems, doing away with all individual stoves. Where this is not possible, asbestos mats are provided for the stoves to rest on, and where the stove is in close proximity to a wall an asbestos lining intervenes. Where a stovepipe passes through inflammable material, a hole is cut through same two inches larger than the diameter of the pipe and a perforated metal thimble inserted, this providing a free passage of air between the pipe and material through which it passes.

All installations of new electrical lines are laid in conduit, fuse blocks and switch boards are placed on slate bases, and enclosed in locked steel boxes and only metal or porcelain shades used on electric lights.

Accumulations of oily turnings, shavings, coal dust, etc., are removed every day; oily drippings from machines are caught in pans, which prevents the floor from becoming oil soaked. Receptacles are provided for all rubbish, and their use enforced. Steel lockers, where clothes may be hung, are provided for all men, and the men warned against the dangers of placing oily clothes in rolled-up bundles in them. Gas meters and regulators are located in sheet iron buildings, having a lock on the door with sign on the outside warning of the danger.

At places, such as the oil house, paint shop, carpenter shop, pattern shop, pattern storage, etc., we absolutely prohibit smoking or the carrying of open lights in the vicinity; this rule our police effectively enforce. In addition, all gasoline tanks are placed under ground. In the smokestacks of all locomotive cranes and engines, we have placed cinder arrestors. These are just a few instances to indicate the lines along which we work in preventing fire.

In discussing the problem of fire fighting, we will first briefly detail the kind of equipment we use, and its placement. Pyrene extinguishers are placed near all electrical apparatus, in all the company's automobiles, in the offices, oil houses, paint shops, etc. Two and one-half gallon soda and acid extinguishers are placed wherever there is danger of a wood or rubbish fire, such as the carpenter shop or the pattern shop; 40-gallon soda extinguishers on wheels are placed wherever a volume of water is necessary, while the proper hose connections are being made. Sand boxes, buckets, and water barrels are placed at other convenient locations.

Entirely encircling our plant we have a looped high-pressure water line, ex-

Digitized by Google

clusively for fire, carrying 40 pounds pressure at all times. Each loop is provided with valves that control each section, making it possible in case a line bursts to shut that particular section off without affecting the rest of the loop or line. In case of a fire the pump houses are immediately notified and pumps started which raise the pressure to 150 pounds. Hydrants are spaced according to the fire hazard at any locality and in easily accessible places. All hydrants along the high pressure line are painted red. In addition to this, conveniently located, are hydrants on the mill service line; these are painted green, and furnish a pressure of 40 pounds at all times. We use a 2½-inch double jacket of cotton, rubber lined, and Underwriters Laboratories standard hose, which is distributed in quantities of 300 feet throughout the mill, where necessary hose carts are provided for convenience in carrying the hose to the fire.

To combat roof fires we have placed 200 feet of hose at various places on the roofs, convenient to risers from the ground and near high pressure hydrants which give us 120 pounds pressure on the roof; the roof is reached by steel ladders, having a safety back.

To insure the proper use of our equipment in case of fire, 20 volunteer companies on days and 20 on nights, located advantageously throughout the mill, have been organized; each company consists of a captain, hydrantman; two nozzlemen, and four hosemen. These men drill twice each month, once in their own department and once on the common training ground in front of fire headquarters. For each drill these men are paid 50 cents in addition to their regular wages, this amount being paid semi-annually, just before Christmas and the Fourth of July.

In charge of all fire equipment and companies is the fire chief, who devotes his entire time to this problem, having an assistant on days and nights, selected from foremen whose work carries them to all parts of the plant. Once a month a round table meeting is held of all assistant chiefs and captains, at which various problems are discussed and plans mapped out for fighting fire at any given point.

At present we are installing the Gamewell fire alarm system, which will divide the plant into 11 zones. In case of fire, by pulling a box the alarm will sound at fire headquarters, in the particular zone of fire; at the pump houses, and at the electric shop. At present in case of fire in any department, the whistle in that department used to call the millwrights, electricians, etc., is used to sound the fire alarm and is responded to by the fire company in that department. In case of a general alarm the main whistle of the plant is blown in accordance with a signal system which indicates the zone in which the fire is located, and is responded to by all companies. The reason our electrical department is notified of every fire, is because it is our policy to have an electrician at each fire; first, to insure the safety of the men responding to the call against electrical dangers, and, secondly, that ignorant pulling of switches, etc., will not result in the stopping of operations in the part of the mill not affected by the fire.

This, in a general way, is our manner of fighting fire. In order that our equipment may always be in first-class condition we have a hose drying and washing tower, to which the hose is taken after each fire and is washed, cleaned, and tested.

Each month, the captains make a report on a form provided for that purpose of the fires within their territory during that period. Within 6 hours after a fire the superintendent of that department is required to make a notification to the fire chief thereof. At the end of the month, the fire chief, from the reports of the superintendents, captains and from his own personal investigations, makes out a report of fires, drills and of the condition of the equipment, etc., with recommendations for such new equipment as he may need. This report is transmitted to the safety director and general superintendent.

Digitized by Google

Alcohol Vs. Safety

By Dr. J. P. Hourigan

The Larkin Company, Buffalo, N. Y.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

OUR ancestors mistook alcohol for a comedy and they laughed, but to the observing student of today the tragic element is only too evident in all its ghastly reality.

By carefully noting the effect of alcohol upon the different tissues and organs of the body, a true knowledge of what it actually does in the system is easily obtained. As the factor of deterioration and degeneration increases in the individual the factor of safety in the industry lessens. In order to cover as much ground as possible, I shall for the most part state only the premise, the amount of injury in the individual caused by alcohol, and let your judgment supply the conclusion, the lessening of safety in the industry.

Alcohol is a narcotic poison and in all its forms belongs to that class of poisons. This class of poisons includes opium, morphine, ether, chloroform, chloral, heroin, etc. It is by far the most dangerous of the class. While the other poisons of this class are productive of distinctly evil functional effects, alcohol, being equally seductive, and as a habit more obstinate and tyrannical than other narcotics, is, at the same time, producing organic changes and working destruction to important vital organs and so eventually ruining the intellect and moral nature as well as the physical body.

Alcohol impairs every human faculty. The higher and more complex the human faculty the more pronounced is the effect of alcohol upon it. Alcohol is a potent disturber of the function of digestion. It causes congestion of the coats of the stomach and intestines. Your stomach is the most important organ in the department of the interior. It generates the motive power for the human machinery.

ALCOHOL IS A POISON

Its destructive influence upon the liver can be easily recognized. Cirrhosis, or hardening of the liver, is universally recognized as being nine times in ten of alcoholic origin. Fatty degeneration of the heart is frequently met with in chronic alcoholics. The ultimate effect of alcohol upon the heart is to depress, in larger doses to paralyze that organ. The young bucko, who, in his bravado, drinks a pint of whiskey in one portion is found, a half hour later, dead in the back room of the saloon is a sample of this effect.

A patient who suffers from alcoholic degeneration necessarily runs a much greater risk of heart failure during a case of acute fever, from overwork, exhaustion, overloaded stomach, and, necessarily, after accidents than does the man with a strong, healthy heart unaffected by alcohol. Alcohol causes hardening and fatty degeneration of the blood vessels and in this way alcohol drinking stands in a causative relation to cerebral troubles, apoplexy, and diseases of the heart and kidney.

Thirty per cent of the insanity in the world is the direct result of alcohol. Statistics from the world over are in peculiar accord in supporting this statement. The combination of alcohol and syphilis in the individual creates the shortest and most direct path to the insane asylum.

Every physician contemplates with increased solicitude every case of pneumonia complicated by alcoholism.

Inebriety is one of these hard and serious facts of which every civilized community must take account. No organization can afford to shut its eyes, if it would live, to the presence of any influence which tends to reduce its vigor or hinder its healthy growth and development.

As more and more things are done by machinery, as trolley cars supplant horse cars, as implements of greater precision and refinement take the place of cruder ones, as the speed at which machinery

Digitized by Google

is run is increased, as the intensity with which people work becomes greater, the necessity of having a clear head during hours of labor becomes imperative, and every condition that surrounds modern business life necessitates sobriety on the part of the worker.

Injuries in the drinking man heal slowly, are more liable to infection, bring on neuritis and other inflammations, more readily endanger life, are liable to bring on delirium tremens, and only an expert anaesthetist can get an injured drinker under the influence of an anaesthetic. The struggles of the injured drinker and his heart action during this procedure are most disconcerting to the onlooker.

The amusing and strange thing is that the alcoholic drinker always imagines he is more powerful and more exact in his physical activity, and that he is doing and is capable of doing better mental work than when similarly employed without alcohol, while all experiments exactly and carefully made show the exact opposite.

A recent English poster signed by leading commanders and surgeons of England reads:

"It has been proved by the most careful experiments and completely confirmed by actual experience in athletics and war that alcohol:

"1. Slows the power to see signals.

"2. Confuses prompt judgment.

"3. Spoils accurate shooting.

"4. Hastens fatigue.

"5. Lessens resistance to disease and exposure.

6. Increases shock from wounds."

Serious injuries, such as broken limbs, are almost sure to bring on delirium tremens in the drinking man, and 50 per cent of delirium tremens following trauma end in death. As the compensation laws compel you to pay for results of injuries, a difference between the cost of a broken arm and the cost of life, is part of the price you pay for the saloon at your gateway.

NO SAFETY WITH THE SALOON

Machinery is guarded, safety devices are installed, human ingenuity exerted to the utmost to guard the workman and yet accidents happen. Campaign against alcohol is one of "Safety First." Where the saloon exists there can be no safety. The saloon cannot be long tolerated in a place where it directly causes the maiming and killing of men thus putting an extra burden upon the family, the State and the industry.

"The liquor traffic," says Terence V. Powderly, "is responsible for nine-tenths of the misery among the working classes, and the abolition of that traffic would be the greatest blessing that could come to them."

I believe after this evidence, which is but a meager portion of all that could be collected, as I have but touched a few of the high spots, I am justified in saying that a saloon in the neighborhood of an industry is a reflection upon the courage, the efficiency, and the moral tone of that industry.

Intemperance is a proximate cause of a very large proportion of the crime committed in America. Fully three-fourths of all the prisoners with whom I have personally conversed in different parts of the country admitted that they are addicted to an excessive use of alcoholic liquors.

"In the next great war nerve power will decide the victory. Victory will be with the nation that uses the smallest amount of alcohol," said the German Emperor before the present unpleasantness in Europe began.

David Lloyd George says: "We are fighting Germany, Austria and drink, and so far as I can see the greatest of these three deadly foes is drink. I have a growing conviction, based on accumulating evidence, that nothing but root-and-branch methods would be of the slightest avail in dealing with the evil."

The universal verdict against alcohol is the same. Because it is leading civilized humanity on the path of deterioration, degradation, and degeneration, because it is the breeder of inefficiency, because it is the enemy of safety it must go, and the present prospect is that it will be driven out in this country by a firm-fisted industry.

Digitized by Google

Safety from the Economic Viewpoint

By B. Frank Day

Statistician, Philadelphia Electric Company, Philadelphia, Pa.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

THE Biblical query, "What shall a man give in exchange for his soul?" seems to suggest the unlimited value of a life, both in this world and in that toward which all men travel, and if it were possible to translate such value into our money standard there would be few persons willing to exchange present certainties or future hopes for all the visible wealth of the earth. If this be a fact, it then becomes all the more inexplicable that our industries and industrial workers should continue to be slaves to the will of that arch enemy of mankind, *"Carelessness."*

We have charged both employer and employe with being unimpressed with the tremendousness of the wrong and the economic loss being inflicted upon society year after year.

THE TOLL OF CARELESSNESS

When a calamity occurs and a dozen or a hundred lives are suddenly extinguished we are horrified, giving little heed to the fact that day after day the industries of our country—one here, another there—are paying a toll of human life to *carelessness* so great that, when each year's records are accumulated, they tell us that more than 50,000 lives have been placed on the altar of the demon; and as though this tribute were insufficient, industry contributes a spectacle of suffering, mangled humanity, the result of more than 2,000,000 personal injury accidents each year.

In this age of progress we are told that we shall no longer give legal consideration to the question of fault or neglect, and the point of who or what might have prevented the disaster is discussed for a time and forgotten all too soon. The law of the nation or of the State decrees that industry shall pay.

But what is the price of a human life? And what is the value of an arm in its relation to a man's usefulness and earning capacity during a lifetime? Unquestionably, the loss becomes a permanent economic loss and financial burden to society, removing a producer, and industry (maintained by society) must continue to support the non-producer and his dependents.

What do accidents cost? The 50,000 and more fatalities that are recorded each year cost the industries (and the public), assuming the low average of $1,500 per case, about $75,000,000 each year, and 2,000,000 non-fatal accidents, which, at an average cost of $25 per case, add $50,000,000 to the accident account. To this tremendous cost of $125,000,000 per year must be added a wage loss to the injured employes and a service loss to the employers during the absence of the injured employe, as well as a large expense for medical service.

In considering the cost of accidents it is obviously wrong to do so merely from the viewpoint of the immediate dollars expended. Rather must we consider the question from the angle of what prevention would mean, for therein, after all, lies the real economy of safety.

ADOPTION OF STANDARDS

For the purpose of statistical computations the United States Bureau of Labor Statistics has adopted the following standards:

1. Three hundred days is an industrial work year.
2. Available statistics indicate that the average age of workmen killed or totally disabled is approximately 30 years. (Wisconsin's experience, as calculated by E. H. Downey, formerly statistician for Industrial Commission of Wisconsin.)
3. Taking into consideration the hazards of an industrial group the expectation of life is taken as 30 years at age 30.

This would indicate an economic loss of 300x30=9,000 work days for each fatality; or, for 50,000 fatalities referred to, an aggregate economic time loss

Digitized by Google

of 450,000,000 days, due to the fatalities of one year.

Assuming an average wage of $2.00 per day, we convert this into a stupendous money loss of $900,000,000. *What a price to pay for carelessness!*

The experience of the company with which the speaker is connected is recorded here, not with the slightest degree of pride, but rather as an illustration of what industrial fatalities mean in one company, and as an incentive to redoubled efforts to prevent; also to indicate that the individual employer has a large share of responsibility for the total loss and that safety means a worth while saving.

During a period covering the past ten years the fatalities have aggregated 33 (average age, 31.5 years). The time loss, therefore, has been 9,000x33=297,000 work days, or a total economic money loss of $594,000 for ten years—an average of approximately $60,000 per year.

This presents to our minds an economic loss so great that it is hard to grasp. With such an appalling wasteful expenditure confronting employers year after year, can they doubt that *safeguarding saves men, time and money?*

THINKING SAFETY

With the safety thought in mind while plant and equipment are being constructed, the safeguarding problems and costs are minimized and paid for only as original equipment.

In the company which the speaker represents, where the question of safety has always been given a fair degree of attention, one result of the organization of employes into an active safety league was a reduction, within a period of two years, of 29 per cent in disabling accidents, 51 per cent in days lost, 34 per cent in amount paid during absence on account of injuries, and the end is not yet.

In considering the economies of safety, employers must not delude themselves by thinking it merely a matter of safeguards on plant equipment. The fact is that the very beginning of safety has to do, not so much with machinery, as with sanitation.

Foul and dusty air, insufficient light, stifling temperatures, and bad water are as unsafe and uneconomic as the worst machine hazard that can be imagined. Money spent in correcting these insidious factors in causing industrial accidents will constitute a profitable investment, and should be the first expenditure to be recommended by the wide-awake safety committee, for it is the first step in plant economy.

The worker—though he be of the most ignorant class—has a chance to avoid a tripping or a machine hazard, but unhygienic habits and unsanitary working conditions, though gradual in their effect, will depreciate all workers, and therefore the plant production, in quality, in quantity, and in unit cost.

That this is a fact is apparent from the increasing number of industries maintaining medical and dental service in their plants, either separately or by joint arrangement with some other employer whose forces do not justify separate service.

From the economic viewpoint safety means much, not only to the employe and the employer, but indirectly to the great public for whom all industry operates—the public being, after all, the principal beneficiary of the safety campaigns. It is the public that in the last analysis pays the bill, regardless of whether the payment is made by an insurance company in consideration of a premium, by the employer direct, or through the medium of benefit funds—it all becomes part of production and service costs.

UNTIRING CAMPAIGN FOR SAFETY

Marvelous changes have resulted from the untiring campaigns of the National Council and kindred organizations, but the work is scarcely begun and the duties ahead must be undertaken regardless of difficulties and cost. With a spirit of optimism that overcomes, with confidence in the accomplishment of the one great purpose, *safety through safeguarding and through education,* then will we fully appreciate that *safety is economy.* The development of the safety idea will *prevent accidents,* minimize *all* wasteful payments, and enable workmen to fulfill their real mission—producing the things their fellows require for their comfortable sustenance.

Digitized by Google

Employment, Medical Supervision and Safety

By L. A. Phelps

Supt., Insurance & Maintenance, The Avery Company, Peoria, Ill.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

THE principles, interests, functions and activities of "Employment, Medical Supervision and Safety" are so well known that they are no longer looked upon as innovations. Each of the three has to do primarily with the greatest of all creations—*men*.

First, there is the need of a man—the organization has a place unfilled, it is incomplete. It is of prime importance to that organization that the new member be fit—that he be capable intellectually, physically, and morally, for the responsibility. He must be of a certain and sure caliber of mind, of a certain intellectuality, and of a certain skill and experience—dependent wholly upon the place in the organization which he is to fill.

The man in charge of employment must be keen, broad gage, a good judge of men—with a thorough knowledge of the positions which he is to fill. He must know every job in the plant in order to intelligently supply the men.

Having selected his man so far as experience, ability and character are concerned he must next know whether or not he is *physically* fit. This can be determined only by a skilled physician who is willing to dig deeply into the history and the present physical condition of the applicant.

DEVELOPING HERNIA

The working knowledge possessed by the superintendent of employment and the physician must be so complete concerning the requirements as to obviate the possibility of error in the ultimate decision. They must, between them, know the job and know the man. In the great majority of instances this is a comparatively simple matter, but there comes a day when a promising young man shows up with a physical condition that is *not* promising. Perhaps it indicates that sooner or later he will develop a hernia. The work for which he had been selected is heavy, there is a certainty that he will rupture himself if permitted to go to that job.

In my company this man is not rejected if there is any possibility of placing him. I call to mind one young man who was very eager to enter the tractor erecting department. He had had considerable farming experience and desired to learn tractor construction in order to specialize in power farming.

He applied for work and was accepted by the superintendent of employment. His physical examination disclosed a very small hernia which was entirely unknown to the man himself. Assembling tractors was out of the question and the ambition of the young man was apparently thwarted. He was unable financially to undergo an operation and it seemed that there was nothing that could be done. A conference between the doctor and the superintendent of employment followed.

"Why," said the superintendent, "that's easy. They want a man to set magnetos and wire tractors. That won't hurt him." The physician passed the young man for that job and today he is doing light work of that character, gaining the desired experience and information, studying the tractor and saving money for his operation. A one-sided system would have rejected him and discouraged him.

After your man has been selected and placed he must by no means be forgotten. His career must be carefully watched and his efficiency maintained. Constant medical supervision and periodic re-examinations are absolutely essential.

One of your foremen notices that the output or the "pep" of one of his men is falling off. Perhaps your safety inspector notices that a man is careless

Digitized by Google

when he used to be a very careful man. Perhaps one of your men is the victim of a series of minor injuries.

An examination by a careful, competent and interested diagnostician usually discloses the reason. He is given good, wholesome advice as to his manner of living, his habits and his food. If medical treatment is necessary he is given the benefit of expert knowledge at no cost to himself. He begins to show improvement and is soon feeling fit.

SAVED BY MEDICAL SUPERVISION

One of the foremen was very ambitious, he wanted to advance. To gain his purpose he studied half the night and tried to do his daily work with about half the required rest. His eyes failed him and he nearly wrecked his health. Half an hour with the doctor set him right and by reducing his study hours and increasing his hours of sleep he found that he advanced much more rapidly and is today a successful man. Medical supervision saved him.

Another man came in for his regular re-examination. It was found that his blood pressure was extremely high. The doctor said: "Well, old man, your work is of such a character that you are in no immediate danger from it and your condition is such that it can be entirely relieved by proper treatment. You are fortunate. Your work won't have to be changed."

The superintendent of employment was advised of the man's condition. "But, doctor," he said, "this man is, in conjunction with his regular work, a member of the plant fire department." The result was that the man was immediately removed from the fire department, which was daily jeopardizing his very life. He was given a course of treatment and is today in excellent condition.

One young man came in for treatment with a dermatitis. The doctor inquired carefully into his personal habits and work. He finally decided that the cutting compound used on the lathe operated by the patient might possibly be responsible for the stubborn manner in which the affection refused to heal.

A consultation followed and the superintendent of employment requested the workman's foreman to change his work so as to relieve him of the questionable compound. In a few days the trouble had entirely disappeared.

In this case the work was fitted to the man. No other workmen had experienced any trouble with the compound, or because of having used it, and as it is a standard product it was decided that some peculiar condition in the man himself was directly responsible.

Another young man came to the dispensary with a very nasty looking skin eruption on his arms. He was employed as a dipper—dipping small wood parts in a dip tank filled with a naphtha mixed priming paint.

The doctor diagnosed the trouble as a naphtha dermatitis and ordered the man to discontinue dipping. The superintendent of employment, who stood near, stepped to the telephone and in less than two minutes other work had been arranged for the patient in an entirely different department.

His skin could not stand the naphtha but he was a desirable employe and his new work solved the problem; he had no more dermatitis.

Under the old system the man would probably have laid off until he recovered. When he returned to work he would have suffered the same experience and would probably have finally quit in disgust and discouragement. The company would have lost a desirable man.

The year 1916 has been, in many respects, a very peculiar one. With the entire country in a state of almost unparalleled activity and prosperity and the demand for workmen unusually great, industry has been called upon to face a condition of much unrest in the ranks of labor.

Strikes, walkouts, demands for shorter hours and increased wages have been the order of the day but with these experiences, every day occurrences all about us, my company has almost entirely escaped. There must be a very potent reason for this and it is their sincere belief that their system of employment, medical supervision and safety has been no small factor in their experience.

Digitized by Google

The Goggle Problem In the Chemical Industry

By J. R. de la Torre Bueno

Editor General Chemical Bulletin, General Chemical Company.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

THE chemical protective goggle and its use present every one of the difficulties of the goggle problem, only in a vastly more acute degree. The goggle need not be stout to resist violent impact, but it must be of a material unacted on by acids or other chemicals. It must also prevent liquids from striking or flowing into the eye; finally, it must be ventilated to prevent blurring.

Everywhere the use of goggles presents a problem both material and psychological. The problem is material, in that the type of goggle must be carefully adapted to the work and its inherent hazard, to afford perfect protection; it should also afford a maximum range of vision and be comfortable to wear. It is psychological, because we men are vain—far vainer than women—so are loth to wear anything disfiguring or that may expose us to ridicule; further, many men *will* take a chance. All industries have to contend with these adverse conditions. Experiment and education are gradually overcoming them by devising suitable and comfortable goggles, and by training the men in safety principles by constant instruction and reiteration.

Many goggles have been made for chemical plants—some are still used. One type consists of a frame of soft rubber with a broad piece going across the nose and other pieces projecting beyond the temples. Another has hard rubber cups fitted with pneumatic cushions along the edges, to be inflated when worn by means of two little rubber tubes with stopcocks. Both have the defect of heat; the soft rubber ones have eyelets let in for ventilation, but in such a way that there is always danger of corrosive liquids flowing in. The hard rubber contrivance is **unpractical.** Besides, the pneumatic binding readily gets out of order. The goggle most in vogue consists of a close fitting flexible rubber half-mask, or visor, which adheres so closely to the face that liquids cannot seep under it and flow into the eye. This has a great disadvantage, besides being unsightly, in the extreme discomfort it produces in the wearer by reason of the heat and perspiration it induces over the entire surface of the face with which it is in close contact.

None of these types has efficiently solved the goggle problem in the chemical industry.

THE IDEAL GOGGLE

has only one object, to protect the eye—that organ, at once so delicate and so important to the worker. It is meant neither for comfort nor for beauty, but for safety. But in attaining its prime object, none of the collateral points should be ignored. These, then, are the objects to be attained—the marks of the ideal goggle—in the order of their importance: Perfect protection to the eye, large field of vision, comfort, sightliness.

Perfect protection can be secured only by making the goggle of a material unaffected by chemicals and by making it fit so closely that not above, below nor at the sides may the least drop of a corrosive liquid penetrate to the eye, either by dashing against the goggle or by seeping under it. It must be, therefore, flexible in order to conform closely to the contour of the face.

The large field of vision is a solved problem; it works against a deep eye cup, which tends to increasingly limit the angle of sight with increasing depth.

Comfort depends on two elements: The weight of the goggle and its ventilation to prevent excessive perspiration. In the nature of things, as the chemical goggle is practically a half-mask, its weight can be but little reduced, except

Digitized by Google

by making it of aluminum and of light construction—two possible points of improvement. Excessive heat is overcome by ventilation and by reducing the surface in contact with the face.

The question of sightliness is immaterial, given the necessity for perfect protection with a maximum of comfort.

SIGHT, COMFORT, AND SAFETY

To meet the conditions set forth, the goggle frame or mask should be of flexible wire netting; shaped to the face, but dished sufficiently to keep it from contact except along the edges which are bound with a soft, resilient rubber tubing. The edges should be made flexible, so that they may be bent to conform with the facial contours to avoid undue pressure at one spot or being too far away at another. The rubber setting for the large glasses should afford a wide range of vision and be perforated near the lenses to allow the escape of heated air, thus preventing condensation of moisture and clouding. The openings are on the slant of the frame so that in case acid flows down the face to the glass-settings it will not readily leak into them; but if it does, they must be so close to the glass that any acid would flow down the inside of the lenses. The mask is coated with a flexible acid-proof varnish to make it impermeable and at the same time to preserve it from the corrosive action of the fumes about a chemical plant.

This goggle would overcome three of the difficulties—it would give effective protection with maximum sight together with a large degree of comfort. It is offered as an approximate solution of the goggle problem as we find it in the chemical industry.

Railroad's New Safety Calendar

THE Pennsylvania Railroad has issued a new calendar especially designed for young people to teach them the dangers of taking "short cuts" across railroads, playing on the tracks, or using railroad rights of way, bridges and trestles as highways.

A picture at the top of the calendar shows a crowd of children just out of school, hurrying across the tracks near the school. One boy is seen stumbling on the tracks in front of an approaching train. Another is indulging in the sport of "balancing on the rails." Beneath the picture is printed: "Every year more than 5,000 American boys, girls and grown folks who take such risks as these throw their lives away. DON'T YOU BE ONE OF THEM."

The calendar began with November to cover the remainder of 1916, and is complete for 1917. An extra sheet inserted before the opening of the new year contains these resolutions:

"I will do my part to end the dark record of railroad trespassing in this country.

"I will avoid the danger of using railroad tracks for highways and short cuts.

"I will Stop, Look and Listen at railroad crossings.

"I will endeavor to persuade others from recklessly inviting danger."

Every month of the calendar tells a brief lesson of the dangers and extent of trespassing on railroads, and of the efforts of the company to end it. One shows that in a single year 3,627 people were sent to jail and 2,488 were fined for trespassing on the Pennsylvania railroad.

Important warnings are:

"Don't steal rides, and don't jump on and off trains while they are moving. Thousands of boys, and older people, too, have been killed and maimed that way."

"Never go under or around the safety gates at a railroad crossing when they are down. There is no way to save people when they won't take warnings."

"A short cut across the tracks may save you a hundred steps—and cost you a leg or an arm or your life. Don't take this chance."

Digitized by Google

Health Education

By Dr. L. G. Shoudy

Chief Surgeon, Bethlehem Steel Company.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

IT has been my pleasure for the past two years to spend all my time amongst workingmen and men of all classes and tongues. We are hammering away at safety, first aid, hygiene, and doing what health work we can as we go. And if I have gained naught else, I have looked far enough to see that education—real health education—must be the foundation for all of our safety work. I know that you will agree with me that a healthy body is the greatest asset a man can have.

HEALTH EDUCATION

The "Safety First" idea, as now applied, has reached such a stage that we are only surprised that we did not see the needs of such a movement years ago. The placing of guards, danger signals and other precautions are but the common-sense applications of every-day need.

If it is so necessary to protect machinery with guards, to post danger signals over open places, and to warn in the handling of high explosives, how much greater is the necessity to post danger signals warning the worker of the liability of his greatest machine—the human body?

The best place to start health education is in the home and school. Education of this sort is not necessarily limited to the working class. Every child should be trained in the fundamental principles of health so that in time to come many of our so-called germ diseases will cease to exist and the ravages of uncleanliness will be but a memory of forgotten days.

Now that the child may know, the mother must know and the teacher must know. Teach the mother, show her how the baby should be started, impress cleanliness as the safeguard to the human machine. See that the teachers are taught, that health and hygiene are a part of the teachers' course.

The problem of health education, gentlemen, is not up to the plant safety committee—though they can help; it is not up to the plant owners—though under existing conditions they must help; it is not up to the plant physician—though he must assume it to a large extent as the condition stands. It is the problem for our homes and schools.

Education along any line must be a life process. But direct instruction and persuasion of adults is in a democracy almost insignificant in effectiveness as compared with the same amount of effort expanded upon the plastic childhood. The public school is the hope of democracy, for health as well as for citizenship.

At the present time we are spending large sums for education and to what end? The youth finishes high school, full of ambition and a desire to make good. He has received first class instruction in English, in Latin and in algebra. He has played baseball and football. But in that on which all else depends—health—he is as ignorant as the day he entered. And not only does it end here, he enters college—eager to get through and tackle the big problems of life that heretofore were dreams. He spends long hours at night in hard study, grinds through the day and to what end—a diploma.

FIT MIND BUT POOR BODY

He has been allowed by hard work to undermine what body strength he had and he enters upon his life's work with a mind fit but a body so weak that he cannot cope with the toil and finds, too late, that he must now spend time to build the body.

Only recently I examined a young man, a graduate of one of our large Eastern universities, possessor of two honor "keys." He came to me because he said he felt the lack of "pep"—he felt himself slipping and was not well. He explained to me how hard he had

Digitized by Google

worked to get through college and that he must make good. I inquired of his life, his education, and habits. I agreed with him that, in so far as books and figures went, he had received a wonderful training. But when I talked to him about his health, personal hygiene, he said: "Why doctor they never taught us that at college."

Here was a young man, fresh from college, full of ambition and fire and with a body too weak to meet his mind's desire and the end was that he was forced to give up his work at the plant and is now in Colorado seeking what he should have been taught by his school, by his college, to protect his greatest treasure, his health.

How else in the schools and colleges are we to further this work unless we have medical supervision and instruction?

Do not be led astray that the playing with wands and dumb bells, that baseball and the track take the place of real health education. Teach health education to all classes and you say it will be a varied education. Not so; the primary principles of health are the same for all. They differ not for the rich and poor.

STRENGTH OF A NATION

The strength of a nation is as the strength of its people. The strength of the people is as the health of the people. Keep physically fit because health is wealth and all other values are measured accordingly. Disraeli expressed the proper viewpoint in these words: "Public health is the foundation on which reposes the happiness of the people and the power of the country. The care of public health is the first duty of a statesman." "How are you" is the expression the world over, and your answer is as you feel—as your health is.

Granted that health education is necessary, the question arises: How best to get it? The school as a public universal agency must take the lead and this it is beginning manfully to do. But we must have more. Gary, Los Angeles, and a few other cities have pointed the way and it is no longer an experiment but a truth well founded and must be pushed ahead until every school of this land includes health and hygiene as well as the A B C's of the olden days.

We who live today must teach so that tomorrow's child may profit by our example and experience. Our problem is how to educate for health under existing conditions. To meet the needs of the man in the factory and plant.

Widen the work of our schools, awaken the colleges and universities to the importance of teaching health and then come closer home, you and I, and reach our people as we find them today.

Meet conditions as they are, each in his own little world, and watch results, not in a day nor a week, but in a year or years. Use the movies, playgrounds, and any means at your command. Educate the force to the necessity of personal hygiene and follow this to the homes. Use booklets and bulletin boards. If your shop has safety committees make them health committees. Teach them hygiene, shop and personal. Along with guards for saws and wheels, teach them to guard the human machine. You place guards throughout your plant, teach them that the eyes, ears, noses, etc., were given for a purpose and to use them for that purpose. Use the foreman, teach him to watch his men, to send them to the plant physician without delay. Teach him the value of the eyes, hands and feet, and to this end make him his brother's keeper. Use the superintendent, point out to him that his shop must be clean, have proper light, heat and ventilation.

The officers of the company must be in sympathy with the entire movement for health education in the plants and factories and they will be, because health means efficiency and efficiency means production. The whole spells happiness.

Digitized by Google

Possibilities of Public Safety Work

By Edward C. Spring, Chairman

Asst. to Pres., Lehigh Valley Transit Company, Allentown, Pa

Proceedings of Fifth Annual Safety Congress, National Safety Council.

IT was with a feeling of inefficiency that I reluctantly accepted the high honor from your hands a year ago, as chairman of the Public Safety Section.

Your officers, after going carefully over the field, find that there is a most wonderful future for a section of this character, and that in a sense it will be a clearing house for all other sections as far as their relations with the public at large are concerned.

Your officers have thought best, as a foundation, to confine, for the first year, the section's activities to a few specific acts, which have been as follows:

1. Municipal Safety Organizations (as outlined in prospectus by Vice-Chairman R. W. Campbell).
2. Safety Patrols in Public Schools.
3. Increasing the Efficiency of Local Councils.
4. A National Safety Day.
5. Bulletins of a Public Character.
6. Standard Traffic Regulations.

It has been the purpose of your officers to bring before the various municipalities the outline of municipal safety work, made by Mr. R. W. Campbell, vice chairman of this section. His prospectus, which can be had from the secretary, is a most comprehensive and intelligent outline for work of this character.

The safety patrols in the public schools are, to my mind, one of the most important factors to further the safety propaganda throughout the country. The city of Brooklyn, N. Y., through the efforts of Mr. Bullock of the Electric Railway Section, and chairman of the safety work of the Brooklyn Rapid Transit Company, has shown magnificent results. Last fall your chairman installed a patrol system in the public schools of Allentown, Pa., and although in operation a little less than a year, the effect of the 262 members of the patrol is one of Allentown's greatest assets and is referred to with considerable pride by her citizens.

Your officers have taken up the work of increasing the efficiency of the local councils. As an experiment the Lehigh Local Council No. 5, of Allentown, Pa., has adopted the plan of the National Safety Council in forming various sections. The council has Iron and Steel, Cement, Mining and Public Safety sections, and the renewed interest that has been stimulated through these sections has brought this council to the position where it is one of the largest local councils, although serving a small territory, that we have connected with the national body.

ACCIDENT AND FIRE PREVENTION DAY

The adoption of the National Safety Day was entered into jointly with the National Fire Prevention Association, making it a joint Accident and Fire Prevention Day. Although we were limited in time for advertising this day, the results, in many sections throughout the country, were most gratifying.

The issuance of bulletins of a public character is one that should be carried out on a more extensive scale, dealing with accidents upon the public highways and accidents that are of a universal character.

The matter of standard traffic regulations for municipalities is one that is demanding the attention of the entire country. We have studied the street traffic regulations as outlined by William P. Eno, and recommend them for the consideration of the National Safety Council.

As previously stated, I believe that there is a wonderful field for this section and I sincerely hope that men will be selected to carry on this work fully equipped to meet the many responsibilities which the work requires.

Digitized by Google

Electric Hazards

By D. M. Petty

Superintendent of Electrical Department, Bethlehem Steel Company

Proceedings of Fifth Annual Safety Congress, National Safety Council.

ELECTRIC hazards, accidents, risks, dangers, or whatever one chooses to call the possibility of getting *hurt* by electricity, can be divided into four classes in general accordance to the way one is liable to receive an injury.

The first division is made by dividing all hazards in two classes according to voltage, namely, high and low voltage hazards. Each of these two divisions may well be divided into two classes according to the manner in which the injury is received, namely, shocks and burns.

With low voltage we hear more of burns than of shocks, while with high voltage the reverse is true. It is also true that while there are many more low-tension shocks than burns, they are not so serious, while with high tension a shock proves fatal much more often than the burns with low tension.

SHOCKS FROM LOW TENSION

Personally I do not know of a single case of persons being shocked to death with less than 300 volts. There are, however, cases on record where men have been shocked to death by 110 volts.

The doctors tell us that a man with a weak heart is in danger when receiving a 220-volt shock, and it is well for us to believe it. We can, however, say that 220 volts will not endanger the lives of men when working on a dry wood floor, unless the man gets good contact on both sides of the line. We can also say the same thing with a little less margin of safety of a dry concrete or tile floor. A metal or wet earthen floor, however, provides a good contact for the man standing on it and he is in much more danger. So far as shocks are concerned with 220 volts, we may consider men as normally safe, and extreme precautions are not necessary.

BURNS FROM LOW TENSION

Burns from electric arcs may be divided into two general classes. Burns due to short circuits or ground occurring during construction or repair work. A burn of this kind most frequently comes from the accidental contact with both sides of the line with a screwdriver, pair of pliers, or other tool when an electrician is making a connection.

The hazard in this case is directly dependent on the man. A careless man will get burned often, while a careful man will work for years without a single accident.

It would be extremely conservative to forbid connections, disconnections, or repair work on 220 volts and lower when alive, and the writer does not feel it is necessary or even a desirable step to recommend. The only method that will prove really beneficial to the man, the apparatus and the company for whom he works, is care. Train the electricians to be careful.

One of the frequent places where burns occur is around the open fuse blocks. They are usually spaced close together and often on the live side of the switch. The object of putting fuses on the live side of the switch is to protect the circuit against a short circuit in the switch, but these are so infrequent that it is better to arrange the fuses on the dead side of the switch.

PREVENTION OF ACCIDENTS

As to prevention of this class of accidents, the following suggest themselves as remedies: Train the men to be careful. Eliminate as far as possible work on live parts, such as fuses, by putting fuse on dead side of switch. Use tools with insulated handles where possible. Use enclosed fuses in place of open link type. Use circuit breakers.

The second class of burns differs from the first more in the nature of the men who are burned than in any other point.

Digitized by Google

They are not the electricians, but the shop and mill men. This class includes short circuits, in hand lamps, lamp cords, lamp sockets, rosettes, and now and then a bad fuse.

The following *"Don'ts"* would help to reduce accidents from this hazard:

Don't put in a fuse unless you know why it burned out. Call the electrician.

Don't drag extension lamp cords around on the floor.

Don't play with switches.

Don't try to "fix" the motor or the lights, let the electrician do this—it is his job.

At this point it is well to take up the much discussed question of enclosing low tension circuits.

Few, if any, men are killed from the shock of 250 volts or less. Most men who lose their lives, due either directly or indirectly to shocks, receive such shocks from trolley wires in some elevated position and fall some distance.

Burns usually come from some attempt on the part of the man burned or a fellow workman to repair or adjust live parts.

It would seem, therefore, that there is no necessity for going to any great extreme in totally enclosing low voltage. Because:

1. Parts that need adjusting or repairing must be uncovered before such repairs or adjustments are made, and the same hazard for a short would exist after enclosing as before.

2. Trolley wires and such bare lines cannot be inclosed without making it very difficult to install or repair same.

It seems to the writer that the proper course to follow is what may be termed a "middle course"; that is, enclose parts that the machine operator must handle to properly do his work and design the rest of the layout to avoid short circuits to the electrician and forbid others handling in any way this part of the apparatus.

Take, for example, a motor-driven lathe as a typical machine:

Following in through the power lines, we come first to the circuit breaker. By properly locating this and by using a design with both sides of the line separate, it is unnecessary to enclose it even in an iron box. The arcing tips should be so arranged that the arc flies up, and should a short circuit exist in the wiring, by closing one side at a time, the breaker will open when the second leg is closed and will not hurt the operator.

Next we come to the controller, which is usually located in an out of the way place, and must be enclosed for its own sake.

Then we come to the motor, which is usually of the open type. If the operator is allowed to adjust, or, rather as the case usually proves, disadjust the brushes, he will at times receive shocks and may get burned by short circuiting a tool of some kind from one brush holder to another of opposite polarity.

If magnetic or so-called automatic starters are used, it is not necessary, unless desirable from a "dirt" standpoint, to enclose the contactors or resistors.

HIGH VOLTAGE

In passing from low tension to high tension, the character of the hazard changes with increasing potential from burns to shocks. From 440 volts up the shock is to be considered dangerous, and while it may be said that a fairly small percentage of those receiving shocks of even 500 volts are killed, yet the fatalities are high.

Shocks from high voltage may be divided into two classes: Contacts with bare parts of a circuit; breakdown of parts supposed to be insulated.

In the first class come contacts with transmission lines, which are and should always be run with bare copper, busses in the power stations, choke coils, switch parts, etc. A large majority of these shocks are due to the old excuse, "didn't know it was loaded," and are properly classified as carelessness.

All high-tension apparatus should be, and usually is, built so as to prevent the man from handling live parts when things are in normal operation, and it is seldom, if ever, that a man is shocked to death under these conditions.

REPAIRS AND ADJUSTMENTS

Most danger lies in making repairs and adjusting apparatus and in so-called temporary work. One of the greatest

Digitized by Google

contributing factors in this dangerous work is some man throwing the wrong switch, energizing a circuit or wire on which other men are working.

The parts being worked on should always be carefully grounded.

One man should attend to the closing of switches.

One man should have charge of the job in hand.

When working on live parts, a carefully designed barrier will prove effective against the opposite polarity, and a well-insulated platform should be used to work from.

Rubber gloves are unreliable and should be used with great care. They may be used for pulling line fuses, etc., where a proper hook stick is also used.

In the second class of high tension hazards, both the electrician and the operator are subject to the danger of some part of the insulated circuit breaking down and charging a part of the apparatus that is normally safe. One of the most dangerous points in this connection is the step-down transformer. The high-tension primary may break through the insulation and charge the low-tension secondary with high voltage, and thus impose high where only low tension is supposed to be.

The manufacturers as well as users of transformers have always paid a great deal of attention to this one point, and it is seldom a break occurs outside the testroom of the manufacturers or during a lightning storm.

When we have discussed shocks from high tension, the hazards of that division are almost covered, for while we may have shocks without burns, it is almost impossible to have burns without shocks on a high-voltage circuit. Contact with both sides of the line is less liable to happen on account of the greater spacing of parts with high tension and the current available to make an arc is less than with low tension. Reduction of accidents in the electrical field is dependent on the extent to which we can impress the men to be careful and is, therefore, no different from the other lines of work.

There is one more point, however, that should be brought out very strongly for the benefit of the workmen rather than the electricians, and that is to let electrical apparatus and wires alone. When there is trouble, call the electrician.

Classification of Hazards in Experience Rating

A Note by Arne Fisher on an Application of Bayes' Rule

Proceedings of the Casualty Actuarial and Statistical Society of America.

IN a recent review in the *Journal of the Royal Statistical Society* of my treatise on "The Mathematical Theory of Probabilities" under the discussion of the sixth chapter, dealing with Bayes' Theorem, the reviewer states:

"Upon the whole we agree with Mr. Fisher's conclusions respecting the theorem, but we should need much space to define our exact measure of agreement. We may, however, remark that the real value of Bayes' principle seems to reside in its application to the study of consistency, that is to say to the problem of determining whether two or more samples can properly be regarded as having been derived from one and the same 'universe.' This aspect of the matter has not engaged Mr. Fisher's attention."

This suggestion of a further—although not new—application of the famous and often misused Rule of Bayes is of some value in classifying hazards inside various industries in workmen's compensation, and I gladly take the opportunity to extend my discussion of the principle as originally developed in my book, especially in view of the fact that this re-

Digitized by Google

nowned theorem has received very little attention among actuaries, mostly due to a completely false conception of the true Rule of Bayes as given in the usual discussions under what is known by the ambiguous name of "inverse probability."

Starting from first principles we have observed a certain event, E, the probability of which is unknown, to have happened m and failed $s-m$ times in s total trials (samples). Using the principle of equal distribution of ignorance as the basis of our calculations, merely assuming that all possible events are, in the absence of any grounds for inference, equally likely, the probability that the event, E, will occur in a following trial (i. e., in the $s+1$ trial) is expressed by the integral:

$$P = \left[\int_0^1 y^{m+1}(1-y)^{s-m}dy\right] \div \left[\int_0^1 y^m(1-y)^{s-m}dy\right].$$

The probability that the event, E, *will* occur n times and fail $t-m$ times in a second series of t total trials (order of happening of the individual events being immaterial) may then be expressed as follows:

$$P_{(t,n)} = \frac{\lfloor t}{\lfloor n \lfloor t-n} \cdot \frac{\int_0^1 y^{m+n}(1-y)^{s-m+t-n}dy}{\int_0^1 y^m(1-y)^{s-m}dy}.$$

Letting n assume all integral values from $n=0$ to $n=t$, we get the various probabilities that E will happen 0, 1, 2, 3 . . . or t times in the second series of t trials. The sum of all those probabilities must necessarily equal unity as some one of those combinations is bound to occur. Hence we have:

$$\sum_{n=0}^{n=t} P_{(t,n)} = 1.$$

The values of $P_{(s,n)}$ for various integral values of n are easily computed from the table of Degen.

The great practical value of the formula lies in its application to test whether two samples may be regarded as belonging to the same type or universe. A few illustrations will better serve to illustrate this statement.

Example 1.—The Danish physician and biologist, Dr. Permin, in his "Tetanusstudier" gives the following observations on treatment of tetanus (lockjaw) by means of serum. One hundred ninety-nine cases of tetanus were not treated with the serum and only 42 or 21 per cent were cured. Another sample of 189 cases were treated with the serum and 80 or 42 per cent were cured. The question is now: Is the variation due to sampling, or would it be reasonable to assume that the serum has been favorable?

Here $s=199$, $m=42$, $t=189$, $n=80$.

Substituting these values in the formula we have, using Degen's Table:

log $\lfloor 122$ =	202.9945390	log $\lfloor 389$ =	840.2439992
log $\lfloor 266$ =	531.1078500	log $\lfloor 42$ =	51.1476782
log $\lfloor 200$ =	374.8968886	log $\lfloor 157$ =	278.0692820

log $\lfloor 189$ =	349.7071362	log $\lfloor 80$ =	118.8547277
	1458.7064138	log $\lfloor 109$ =	176.1595250
			1464.4752121

or log $P_{(189,80)}$ = 6.2312192, $P_{(189,80)}$ = .000001703.

Hence the probability that the two samples are identical is about 2 in a million, or we may say with certainty that the serum has been beneficial.

Example 2.—A certain tannery with a payroll of 1,008,000 has shown a loss during the year of 8,000. Another tannery with a payroll of only 251,000 has in the same year shown a loss of 3,000. Would it be reasonable to assume that the second plant was inferior to the first in safety protection? I have no doubt that many of our so-called "practical" safety experts would jump to the conclusion that on the strength of those figures the second plant had shown a safety standard of 50 per cent less than the first plant, the loss ratio being 12 per 1,000 as against 8 per 1,000 of the first plant. Now let us see how the same problems look in the light of the theory of probabilities. Choosing 10,000 as the

Digitized by Google

unit of payroll and 1,000 as the unit of losses, we have here a neat little problem in chance, worded as follows. A first sample of 100 observations showed 8 successes, what is the probability that a second sample of 25 observations will give 3 successes?

The formula gives

$$S=100,\ m=8,\ t=25,\ n=3.$$

log | 11 =	7.6011557	log |126 =	211.3751464
log | 114 =	186.4054419	log | 8 =	4.6055205
log |101 =	159.9743250	log | 92 =	142.0947650
log | 25 =	25.1906457	log | 3 =	0.7781513
	379.1715683	log | 22 =	21.0507666
			379.9043498

Hence $\log P_{(100,\ 8)} = 1.2672185$, or $P_{(100,\ 8)} = .185020$.

In other words, we may expect that the loss will be 12 per 1,000 in about 19 in 100 cases, by no means a rare occurrence. "Safety experts" please take notice and don't make rash conclusions, as it is quite probable that the apparent increase in hazard simply is due to random sampling.

I give below a complete tabulation of the probabilities of $P\ (25,\ t)$ for various values of t from 0 and upwards.

When $s=100$ and $m=8$

t	$P_{(25,\ t)}$
0	.126823
1	.243890
2	.252300
3	.185020
4	.107117
5	.051757
6	.021565
7	.007910
8	.002589
9	.000763
10	.000203
11	.000049
12	.000011
13	.000002
14—25	.000000

The above table shows that we can expect a loss of 3,000 or more in a sample of 250,000 in about 39 out of 100 cases, such excessive loss being due entirely to random sampling (chance) and not due to other influences.

I could go on and quote number upon number of fallacies of medical health officers who, with truly procrustean efforts, attempt to verify a pet theory of their own by samples too small to be representative. It is, I am sure, only the mathematically trained statistician who will be able to tell whether deviations from standard rates are the result of random sampling or due to truly representative causes. When preferential rate-making just now is in such vogue in American assurance circles, I can but apply a solemn warning to the statisticians and actuaries to be extremely careful and, before making a final decision, to submit the data to a painstaking mathematical analysis, which again should be undertaken only by the properly trained expert.

Hazards of Electric Pressing Irons

National Fire Protection Association

THE $4,000,000 conflagration of March, 1916, in Augusta, Georgia, is believed to have been caused by an electric pressing iron left in circuit in the dry goods store in which the fire broke out in less than 30 minutes after closing.

In New York City alone, 16 fires involving losses of from $5 to $400 occurred in 1914 from electric pressing irons left in circuit and 27 in 1915. The budget of reports for 1916 indicates a further increase.

Several more or less successful devices to minimize the hazard have been tried out, but a recent and more effective one consists of a thermostatic switch placed in the iron which automatically cuts off the current whenever the temperature exceeds a predetermined range —usually 400 to 600 degrees Fahrenheit.

It is to be hoped that in recognition of the undoubted hazard of the ordinary electric pressing iron, a more extensive development along these and similar lines will be stimulated by the co-operation of manufacturers, central station companies and inspection departments.

Digitized by Google

"The Man On The Job"

Prevention of Accidents by Education of Workmen, Methods of Management and Mechanical Safeguards

SAFETY ENGINEERING offers each month one First Prize of $10.00 *and one Second Prize of* $5.00 *for Articles relating to Industrial Accident Prevention. In case of a tie, the full amount of the prize will be paid to each tied contestant.*

No. 254 VARIOUS INDUSTRIES—AN IMPRESSIVE SAFETY LESSON.—An educational feature of great merit was recently carried out at a large manufacturing plant in Philadelphia with gratifying results.

A workman in the grinding room was struck by a flying piece of metal and escaped serious injury, possibly the loss of one eye, by the use of safety goggles while at work. The metal piece struck the lens directly in the center, making a small hole and cracking the remaining part. The only injury sustained by the man was a slight abrasion on the side of his nose which was hardly noticeable. It could be readily seen that a case of this kind was a wonderful example of accident prevention and the results to be gained by advertising should be well worth the effort.

After taking the matter up with the superintendent and showing the goggles with the lens cracked and pierced, but still intact, a suggestion was made that they should be sent on a trip throughout the plant in care of the foremen of the various departments. The suggestion was immediately adopted and an order issued to each foreman that he personally should pass the goggles among the men, explaining how the protectors had been the means of saving an eye, dwelling upon the after effects of such an injury, bringing out particularly the misery and privation that would necessarily come to a man's family in the event of disability.

The department heads were enthusiastic over the idea and immediately began talking the matter over with the men in their respective departments. When the time came for the goggles to pass through a department the men were expecting them and it was remarkable to note the effect the silent eye saver had upon those strong men, who had at times ridiculed the idea of wearing anything to prevent eye injuries.

It is needless to state that the results were marvelous and in a short time every man whose work required such precautions could be seen taking great care of his goggles, at no time forgetting to use them.

❦ ❦ ❦

No. 255 ALL INDUSTRIES—ADVERTISING THE "SAFETY FIRST" IDEA.—The methods outlined herein were used in a campaign which resulted in two years in reducing the number of accidents at a plant employing between 4,000 and 5,000 men, more than 50 per cent.

BULLETINS

Bulletins can be roughly divided into three classes:

(1) Those containing a general message.

(2) Those containing a message on particular subjects.

(3) Those describing a special hazard or an accident which has occurred.

There are, of course, some which are combinations of any two or all three of these classes.

Home-made bulletins are best and should contain strong, vigorous language rather than a mere colorless statement of facts. I will illustrate, for example, one of each of the classes mentioned.

The first and second of these are now in the printer's hands and the third was displayed on our boards some time ago.

(1) The High Cost of Accidents.
It affects us this way $ $ $
It affects you this way (*Photo of several crippled hands*).

Digitized by Google

Let's all pull together.

---

(2) Eye Doctors Live in Mansions.
(*Picture of mansion.*)
We don't grudge them the money,
Fact is:
If you'd all agree to wear goggles,
We'd agree to pension ours.

---

(3) WHY DID HE DO IT?
(Man's name and number) of the .....shop felt with his fingers to see if drill had come through casting he was drilling.
(*Photo showing man reaching under casting placed on drill table.*)

There is not the slightest doubt in (man's first name) mind now as to whether that drill came through—he can prove it by his finger, which is shorter by one joint than it was before he felt for the drill. He now asks himself, "Why did I do it?"

A GOOD RESOLUTION

"While working around moving machinery I will keep my hands always within sight of my eyes."

Language cannot be too vigorous nor headlines too glaring. Our bulletins often contain slang and we have recently adopted a character in the person of a small pert faced youngster whom we call "Sunny Joe." He often poses for the photographs illustrating our bulletins and the language on these bulletins is then the vernacular of a street urchin. We have used him also in our monthly publication on safety topics as the author of stories containing a "Safety First" moral.

The most difficult part of the bulletin service is getting original ideas. Halftones, line-cuts and the printer come next and are simply a means toward an end. That end is to get your ideas before the persons you are trying to reach. The most common objection raised by concerns which are small in extent and have only a few bulletin boards is the cost of printing, etc. When I presented my ideas for the first two bulletins, explained above, to the boss, I used a crayon pencil on a sheet of letter size paper for the wording. Photographs of crippled hands were cut out of a National Safety Council bulletin and pasted in place. The picture of a mansion was cut from an advertisement in the *Saturday Evening Post* and pasted in place. I then had two bulletins just as effective, if not more so, than those we will get from the printer. As the labor in getting up several gross of each, the cost of several gross additional National Safety Council bulletins and the cost of several gross copies of the *Saturday Evening Post* is higher than the printer's charge—for these and for no other reasons, are these bulletins being printed.

There are a number of ways in which bulletins can be gotten out cheaply in small numbers. If you can hire a photographer with an 8 by 10 camera, have him make a mask to fit inside of the box which will cut off the light on all but a section about half the area of the plate. He can focus the picture on this part and on the blank part of the negative, appropriate wording can be lettered with india ink. He can then make the prints or you can contract with him for the negative only and blue-print from it.

Bulletins can be made on a tracing cloth, a blank space being left for small photographs and the photographs pasted on the blue-prints afterward. If you have a cartoonist in your plant, have him illustrate your idea on the tracing cloth.

The suggestions given above, of course, represent savings only where a half dozen or more boards are to be supplied. Where there are fewer boards a crayon pencil and illustrations cut from safety publications are equally as good.

Boards for displaying bulletins should be placed at a point where the greatest number of employes are likely to notice them. There are many who object to the uncovered board, that is, one not enclosed with glass front, and many who object to large boards. I believe in both. During a two and a half years' experience with 35 uncovered boards with a capacity of 20 bulletins each, I have seen but one bulletin defaced, though many have finger marks on them, which I regard as more in the nature of a testimonial than as a defacement.

Bulletins when taken down should not

Digitized by Google

be destroyed. They should be utilized to the utmost and therefore it is a good idea to place them in a binder attached to the board. I know of several such binders in which the printing on some of the bulletins is almost illegible from black finger marks. Surely no more interest and appreciation could be desired. Another method of getting the last ounce of good from the old bulletins is to put them in boxes located in convenient places. The boxes are lettered on the side with the words "Take one." I have seen 100 extra copies of a single bulletin disappear from one of these boxes in 36 hours and another hundred placed in the same box immediately afterwards disappear just as quickly. These are usually shoved in a pocket and taken home.

SCORE BOARDS AND COMPARATIVE CHARTS

Score boards like comparative charts usually compare the records of the different departments. The idea is to promote a spirit of friendly competition. No matter how painstakingly records are gone over to make up a proper handicap sheet, there will be grumbling and discontent. Therefore, the best method is to compare each department with its own previous record for a certain period, either in the number of accidents per full time men or time lost per full time men.

I know that score boards and comparative charts are of value, as hardly a week goes by in which I do not have to explain to one or more foremen why a red light appears opposite their department on the score board, or why the blocking opposite their department on the chart is shown beyond their allowance.

SHOP MAGAZINES

Monthly publications containing a variety of articles, short paragraphs and illustrations are of great benefit. The columns should be open to any who wish to contribute articles, providing the subjects are of general interest to the men. Though these are rather expensive, I have no doubt that they are a paying proposition in large plants. In our own plants there is no question of their popularity, as there is always a demand for extra copies.

No. 256 ALL INDUSTRIES—HARMONY—SAFETY.—The recent awakening of the business world to those features of management which make for a more harmonious relation between employe and employer is without question the most important thing that has come to this commercial age. Back of each such movement or right thought, there is to be found a cause. Sometimes the cause can be traced to one or two individuals who are reflecting the good that we all should reflect, at all times. This is all very true in the case above mentioned. A man in the steel industry and another in the employ of a large and well known railroad, of their own largeness of purpose, started a bit of safety which grew by leaps and bounds, until these same men, together with others of similar purpose were responsible for the organization of the National Safety Council, which today, with its large membership and splendid activities, is responsible for the advanced thought in industry.

How true it is that safety and harmony are almost synonymous terms in industry. In so far as safety education tends toward the more harmonious relation of men and management, the more successful will that education be, and the more productive will it be of the desirable results.

The properly guarded hazard is the one that can be dismissed from the minds of the workmen. This is the best recommendation for the solid metal guard—properly constructed, solid guards that do not allow materials to fall into gears, causing accidents. On the other hand, the offending portions of the machine cannot be seen and are not in the mind, constantly unnerving the operator, who is left free to think of problems of greater importance to himself and his company.

That harmony is productive of safety, no one can successfully contradict. On the other hand, did you ever watch the accident meter or curve during a period of labor unrest? If you have, you are satisfied that the thing you want is harmony Not unrest, but a condition of rest or ease of mind.

Our cause is a worthy one; we cannot

Digitized by Google

do too much for its advancement. The true safety engineer is very grateful for every step of advancement made in response to the right effort.

❦ ❦ ❦

No. 257 VARIOUS INDUSTRIES—MAINTAINING INTEREST IN ACCIDENT PREVENTION.—Following the inauguration of a campaign for accident prevention, when enthusiasm has been developed and the matter of reducing accidents is in the minds of all, there comes a time when the repetition of the same methods does not bring a corresponding response. Then the question comes, what permanent method can be applied month in and month out which will be effective in keeping up the interest?

One important means to accomplish this end is by developing competition between the various departments, so that each month the relative standing of every department is posted, and at the end of the year it is known which departments have excelled. To do this in an ordinary factory, where the hazards in various departments vary greatly, where some departments are small, employing but a few men, while others have many hundreds, makes it necessary, in order to give a fair comparative rating, to work out a handicap plan, so that the relative danger and the relative size of each department is taken into consideration in determining its standing.

When such a handicap plan has been successfully worked out, there can be no feeling on the part of any department that it is hopeless to compete, as with this method there is an equal chance for all. The results when posted really show which departments have been "excellent" and which have made a "bad" showing.

The next important step is to visualize the results so that they can be understood by the average workman. To do this, various devices may be used, so that the report posted in each department shows graphically its standing, and a tabulated record below shows its standing relative to the other departments of the factory.

One method which has been found effective in visualizing the standing of the departments is to use red and green discs, at the top of the monthly accident bulletin which is posted in each department, the red disc being covered by the green to the extent to which "Safety" has eclipsed "Danger" in that particular department. Thus, when a department has had an "Excellent" record, the green disc entirely covers the red, showing only rays of red around the rim of the green disc. In case of a "Very Bad" record the green disc is moved to one side, practically exposing the whole surface of the red disc, showing that the efforts towards safety have been unsuccessful in reducing accidents. "Good" and "Bad" records are intermediate between these extremes.

Another method is to use a semi-circular dial with a hand pointing to the periphery. This dial is marked "Excellent" at the left, followed by "Good" and "Bad," while "Very Bad" is at the right, and the bulletin of each department has the hand printed on this dial in the place where its record shows it should stand.

Other devices may be used to illustrate the relative standing, variety being given by changing these from time to time. By this general plan the interest of the workmen is maintained and the foremen stimulated to greater effort in making good safety records.

❦ ❦ ❦

No. 258 ALL INDUSTRIES—PUTTING "GINGER" IN SAFETY.—The fundamental foundation of all safety work is to provide a safe place in which to work. A safe shop pertains to good light, pleasant surroundings, plenty of pure drinking water, and last but not least to have all machines and dangerous places protected in a substantial manner. The paramount reason why so many safety organizations show poor results is that too much stress is given to guarding machines and equipment. It is good business to safeguard belts, gears, and machinery in general, but to have a safety organization that gives results, the safety engineer must keep "ginger" in his work at all times. It is essential that the safety man of any large manufacturing plant should be a student of psychology; he must get away from the idea that all accidents are due

Digitized by Google

to the lack of some particular safeguard. Statistics show that about 75 per cent of all accidents are due to the carelessness of the workers, not to the absence of a safeguard.

The waging of an earnest and never ending campaign along educational lines is the prime factor to a successful safety organization. Get in touch with the workers; listen to their side of the story; join with them in their play and recreation as well as in their labors. Encourage and organize baseball, tennis, and hiking clubs; arrange for dances and other social gatherings; give prizes for winning teams. You will find that the efforts along these lines, the time spent, and the money expended will give you unheard of results in your accident prevention work. Educate your men and women to live in the open, and to study nature. Toilers in good health are the best safeguard one can install in any industrial plant. Try to arrange entertainments, at least one a month, where talks on "Safety First" can be indulged in. Safety meeting means a gathering where everyone joins in a general talk on safety work, as applied to the individual plant. Meetings where speakers get up and talk for hours on statistics, as pertaining to safety, will not give the required results in any business where the employes themselves are concerned. Safety meetings must be full of "ginger," everyone must be kept interested. Have moving pictures on safety and other interesting subjects. Try to arrange with the local movie theaters to show a safety film at least once a week. It will tend to keep the employes interested. Get acquainted with the clergy in the various churches. Try to interest them to give talks on safety in their pulpits. This method of spreading the gospel of safety will reach many of your employes who, perhaps, would not consider the subject from any other point of view.

Organize safety clubs among the wives and families of the men. The duties of these clubs should be to look after the entertainment end of the safety meetings. If possible, serve light refreshments after each meeting. If your plant is large enough to support a nurse, arrange to have her visit the homes, to make suggestions in regard to sanitary conditions and making the homes more attractive, so as to keep men from spending their spare time in the saloons. Have the nurse or her assistants see that the children and the families in general have proper care, both moral and physical, giving lessons in domestic science if possible.

Show pictures on the bulletin boards of how accidents have occurred. Tell how the accident could have been prevented. Bulletin boards used along these lines will give very good results.

The safety engineer should be a man of exceptional personality; if possible, one who has worked from the bottom, and has gone through the grind of the mill, and who understands the wants of men. He must love his work, and must work for safety all of the 24 hours, keeping the "safety irons" red hot at all times.

A successful safety man must first study his own special work, then psychology, economics and sociology, as they are essential to successfully dealing with men, and safety work.

Comments by Members of the Committee

No. 251 is the very best article on the subject of elevators it has ever been my pleasure to read.

Although No. 252 is good and what the author says about the foreman's part in the safety movement is true, his attitude in the matter will follow that taken by the "big boss." Therefore, I think No. 250, who takes the "big boss" to task, should be awarded the prize.

Article No. 251 is the best. I am pleased to observe that all dangerous elements in the factory are being considered by SAFETY ENGINEERING'S consistency. It is a well known fact that the elevator is one of the most erratic of modern conveyances; least under-

Digitized by Google

stood by the average employe, and often receiving the least care. Therefore, let us digress (for a time) from "Safety first" on the "mechanical" end of the factory and take up other matters which are equally essential. No. 251 has clearly presented "his case" and should receive a favorable verdict.

My reason for awarding the prize to Article 251, is that it is "absolutely correct." Both from an inspector's point of view, and from the care and management of elevators.

No. 251 is my choice. It is refreshing to read something new under this heading, instead of the usual rehash of old ideas.

The writer of No. 251 has a full working knowledge of elevators as his article ably proves by the various defects he has mentioned. Many of them would not be noted by the general run of elevator mechanics, and these have been so definitely described and remedies suggested, that I give my vote for this article.

In my opinion Article No. 251 is the best. The article is carefully written, and is without a doubt the result of years of experience with elevators. It is very valuable to anyone having to do with the operating, installing, etc., of elevators.

Article 250 is the best one in this issue. as the writer has put forward, and used much energy, in pointing out a very valuable point in safety work. "For its humanitarianism" it should put a little "inspiration" in all of us.

I vote for 252, as I think the writer has fine ideas on safety and economy.

Prizes for November Articles

First Prize. No. 252. M. J. Eggan, Cost Manager, Port Huron Engine & Thresher Company, Port Huron, Mich.

Second Prize. No. 251. R. Bolling, Safety Inspector, Aetna Life Insurance Company, Chicago, Ill.

Honorable Mention. A tie. No. 250. J. J. Nagle, Inspector, Pennsylvania Manufacturers' Association Casualty Insurance Company, Philadelphia, Pa. No. 253. Thomas Stanion, M.E., Safety Engineer, Commonwealth Steel Company, Granite City, Ill.

Digitized by Google

Eye Protection

by F. W. Shepard, Safety Inspector

American Cast Iron Pipe Company, Birmingham, Ala.

Proceedings of Fifth Annual Safety Congress, National Safety Council.

I HEAR many voices. There must be crowds of people here assembled.

I have come from Alabama, where they say the sun shines bright. They say the flowers there are beautiful and the birds of many colors. They say the landscape has grandeur, that nature has broken records in the wonderful formation of sandstone and granite, of limestone and coal, of iron and gold. They tell me my wife's hair, kissed by the sun, is golden. They say her eyes are brown and full of love, that they are tender and full of pity. They say my children are fair and beautiful. They say Tom's and Mary's eyes are like their mother's. Father's eyes they never mention.

I, their father, didn't believe in goggles. *I am blind!*

(Here the speaker laid aside a pair of blue glasses and a cane.)

Gentlemen, pardon this little by-play. My purpose was to impress you. I'm going to talk about something that is impressive. I have wanted merely to catch, in some way, your attention and hold it—hold it for a few minutes to your eyes. "Eyes" are my subject, and about them I've got something to tell you.

INJURIES TO THE EYES

A large percentage of the accidents or injuries to the organs of vision is brought about through ignorance. A worker, upon receiving a blow upon his eye, a particle of dust or a flying missile in it, immediately rubs it with begrimed fingers. If there is an abrasion, the chances are the eye will become infected. If it is a particle, the rubbing tends to imbed it either on the lid or the eyeball. The illiterate worker, often the foreigner, is unable to read the shop bulletin or poster—should there be any—and is reached only through personal instruction and illustration. It is ignorance which causes him to allow a fellow worker to remove a foreign body from his eye with a lead pencil, a toothpick, a splinter, or a soiled handkerchief on which are thousands of microbes ready to start their multiplication in the warm, moist tissue surrounding his eye. Education, only education, can teach this man to go to the dispensary or the doctor.

Another great source of accidents to the eye is carelessness. Men operating cutting or abrasive machines will depend on the quickness of the involuntary muscles controlling their eyelids to prevent injuries to the precious organs of sight. Men chipping castings will take the same risks for themselves and for others. Even after educational work has advanced in a shop to the point where the workman has been instructed to use goggles and portable screens, to go to the doctor, and take other precautionary measures, you will find him with his goggles in his pocket, his screens in the corner, and entirely disregarding all the points of caution in which he has been instructed.

A great source of accidents to the eye is physical unfitness. The percentage of absolutely normal eyes to be found in the average foundry is small. In order better to prevent accidents to the worker's eyes he should be examined by a thoroughly competent optometrist, fitted with glasses or have such operations performed as will render his vision normal. This is as necessary and should be as rigidly enforced as any other physical requirement. The crane operator in the foundry, who is handling hundreds of pounds of molten metal, often endangers as many lives as the locomotive engineer who depends on his organs of vision for the correct reading of signals by the roadside.

GREATEST SINGLE CAUSE OF ACCIDENTS

My experience in accident prevention work has taught me that abnormal vision, due either to defective illumination, pres-

Digitized by Google

ence of smoke or dust, or constitutional debility, is the greatest single cause of accidents. Actual cases are on record where repeated accidents to the same individual have led to an investigation and correction of his vision by the use of proper glasses, entirely eliminating his accidents.

Governmental statistics attest the fact that 25 per cent of all the avoidable accidents are due directly or indirectly to defective illumination. If we would reduce our industrial accidents 25 per cent at one fell blow we must give perfect illumination.

Why not build or reconstruct our factories and foundries so as to let some of God's blessed sunshine in—a few flowers or shrubs in the windows, imitating in a small way the conditions surrounding our father and mother in the Garden of Eden? The psychological effect of pure sunshine in the foundry is very marked. It does away with the frown. It engenders a cheerfulness of heart and face. It produces an alert, active worker, and—a point that is much considered in modern day practice—it increases the output. Sunshine completely destroys typhoid germs, tubercle bacilli, and other bacterial organisms so harmful to those who toil and the very things which aggravate eyes already diseased. It reduces accidents by showing up the dirty corners, the obstructions hidden in the pathway, the defective equipment, the dusty and smoke laden atmosphere.

GOGGLES

Eyes should be protected from chips, flying dust, particles, emery dust, abrasive material, burns, and external accidents, by goggles. The scientific study and research which has been made regarding goggles has developed them to such a high degree of efficiency that the common excuse offered by a worker that he cannot see through goggles has been overcome. It may be that, owing to local conditions, one goggle is better than another, but if the plan as adopted at our plant is carried out of individually fitting each workman and asking him about them daily, a goggle suited to his individual needs will be secured and then it is only a matter of education or moral suasion to make him use them whenever they are needed.

In addition to the protection given by goggles, hot metal burns may be lessened by putting black oil on chill runners, gates, or damp places with which the molten metal is liable to come in contact.

EYE ACCIDENTS

The most common injuries to the eye in the foundry are:

1. Hot metal burns.
2. Cinders, sand, trash, emery, chips, dust.
3. Foreign bodies imbedded, (a) on the cornea, (b) on the lid and sclera.
4. Syphilitic origin.

The treatments follow:

1. Hot Metal Burn on Cornea—Remove the metal; relieve pain with hot boric compresses or carbolated vaseline and a tight pad over eye.
2. Hot Metal Burn on Sclera or Conjunctiva—Remove metal; irrigate with boric acid, insert carbolated vaseline, and a tight pad over eye.
3. (a) Foreign Body Imbedded on the Cornea—Use 4 per cent solution cocaine, and remove every bit of stain or fragment with a sharp, sterile instrument. Instill 10 per cent argyral every four hours. Eye pad if necessary. (b) Foreign Body on Sclera or Conjunctiva—Remove. Same treatment as for cornea.
4. Syphilitic Inflammation—Give general syphilitic treatment. Salvarsan mercury, or potassium iodide.

Any foreign body penetrating the depth of the eye and passing through the lens will make the lens opaque. This renders the ophthalmoscope useless and the particle can be located only by an X-ray machine.

IMPORTANCE OF SANITATION

Sanitation must not be forgotten. Disease injurious to the eyes often is spread by dust, a public towel, or wash basin. This may be prevented by individual and sterilized wash basins, towels, and lockers. We are protecting our workmen's eyes and general health by installing a dust collecting and ventilating system.

A new man should be examined with

Digitized by Google

the ophthalmoscope. It will frequently reveal not only diseased condition of the eye, but the presence of other diseases which are detected from the blood in the retinal veins, thus giving a chance to treat an infectious disease which otherwise might pass unnoticed until it becomes too far advanced to yield to treatment.

New York's Safety Meeting

THE New York City Local Council No. 14, in co-operation with the People's Institute, held a public safety meeting in the great hall of Cooper Union, New York City, on the evening of December 1. The meeting was well attended.

Marcus A. Dow, president, New York Local Council, made an address to the meeting on "What the National Safety Council Means." Mr. Dow ably presented the far-reaching work which the National Safety Council is accomplishing in many sections of the country towards preventing industrial accidents. He stated that the great growth of the National Safety Council in its few years of existence was largely attributable to the splendid co-operative spirit of the members which unites the National Safety Council into one great and ever-expanding force throughout the country for reducing accidents and increasing conditions of safety in the industries of America.

Deputy Commissioner Laurence B. Dunham of the New York police department spoke on "Accident Prevention from the Public's Viewpoint." Commissioner Dunham has given much attention to the subject of reducing street accidents in New York City through the police department. His speech was most timely, as on the same day the New York police department launched a safety campaign in co-operation with the Advertising Club. Commissioner Dunham stated that unquestionably many automobile accidents were due to the unfitness of those who operate automobiles. There is absolutely no physical examination made as to the fitness of a person to operate an automobile in New York City. A person may be deaf, dumb and blind, a paralytic, subject to fainting spells, or epileptic fits, but if he or she owns an automobile there is nothing to prevent the person from driving it through the densely crowded sections of New York City. Such conditions are deplorable and a great menace to the community. The time has arrived when no person should be permitted to operate a vehicle on the streets of New York or any other city unless in a physical and mental condition to do so safely. The New York police department is issuing a striking card illustrating an automobile accident and warning drivers of vehicles to be careful. In addition to this the department is distributing a pamphlet, giving suggestions on how to avoid accidents in the streets, both to those who walk and those who drive. The commissioner made an earnest appeal to citizens to co-operate with the department in striving to make New York a safer city. The streets of New York are probably more congested than those of any other city and the hazards are correspondingly great. Densely crowded thoroughfares where unceasing lines of vehicles are passing require the presence at all times of vigilant officers to control the traffic and permit pedestrians to cross the streets in safety. The commissioner stated that the time has now arrived in certain sections of New York City when underground passages should be provided for pedestrians to cross the streets and he hoped that legislation would be effected in the near future which would permit this, as it would greatly decrease the danger of street accidents.

John Mitchell, chairman, New York State Industrial Commission, made a stirring address and drew a vivid picture of the streams of human wrecks which daily pass through his office in Albany as a result of industrial accidents. He stated that if any one could spend a day in his office he would be converted absolutely

Digitized by Google

to the vital importance of accident prevention work. In New York State alone the industrial commission's records shows that five men were killed every working day, a great number seriously injured and a far greater number injured in a lesser degree. Mr. Mitchell stated that carelessness was a national characteristic of the American people. The fact that five men will be killed tomorrow and five men the next day and so on for every working day in New York State is a deplorable fact to contemplate, but the great majority of industrial workers do not think that they will be among the victims and the great majority of employers do not think that any of their men will be killed. We all seem satisfied that it will be the other fellow and that is where the fatal mistake is made. What we do know is that five men tomorrow will not go home alive. The remedy is for everyone to be careful and avoid chance taking. Mr. Mitchell laid stress upon the fact that every man is his brother's keeper, no matter what his position may be. We all have a duty to perform and that duty is not only in thinking, but in doing our share to safeguard our fellow men.

Hon. James T. McCleary, secretary, American Iron & Steel Institute, spoke on "Accident Prevention from the Employer's Viewpoint." The iron and steel industry is among the largest employers of industrial labor. Mr. McCleary stated that the prevention of accidents has probably been more carefully practiced in the iron and steel industry than in any other industry. Six thousand men in the Carnegie Steel Works, scattered throughout the plants, are members of the Carnegie safety organization. The U. S. Steel Corporation leads all other employers in accident prevention work and has reduced the accidents among its 250,000 employes to a great extent. The results secured by the U. S. Steel Corporation in the reduction of accidents proves conclusively that the more thoroughly and systematically accident prevention is practiced the more beneficial will be the results secured, and every employer should feel the responsibility of providing a safe place for his employes to work and in addition should instruct them in the hazards of their work and how these hazards can be overcome.

Questions were then invited from the audience on the subjects discussed by the various speakers, after which Mr. Dow showed the safety motion picture, "The House that Jack Built."

Edward S. Sanderson, director of the People's Institute, presided at the meeting and introduced the speakers.

What Is "Inspected" Fire Hose?

THE importance of knowledge gained from accurate testing, as opposed to guess-work, has just been illustrated anew at Allentown, Pa. The peculiar circumstances of the case give it a general public interest.

In the month of October the Copley Cement Manufacturing Company of Allentown had a fire in its stone bunker—presumably from a locomotive spark. The bunker was of slow-burning construction, the fire was quickly discovered and the mill fire squad responded promptly; there should have been little loss.

The fire squad attached a coupling of the plant's expensive new fire hose, ran it to the blaze and turned on the water. The hose burst in five or six places and the fire merely gained headway. The disgusted squad hurried to uncouple the hose and throw in another length, which immediately burst like its predecessor.

By the time a successful stream was finally secured the fire was burning fiercely. The loss amounted to $7,000 and was almost entirely due to the failure of the hose.

Why did the hose burst?

A $7,000 blaze is of no great public interest, but the answer to this question concerns everyone.

Note these points: The hose was not old but new. The company had not economized by purchasing cheap hose; on the contrary, it is reported to have

Digitized by Google

taken a special measure of precaution—i. e., had specified and paid for hose inspected by the Underwriters' Laboratories.

It is alleged that the agents of the manufacturers who sold this faulty hose made the false charge that the Underwriters' hose, to a large extent, is "a game of graft on the part of the insurance companies," and naturally discrediting the value of the rigid inspection made by the Underwriters' before a label is permitted to be placed upon fire hose by the Laboratories.

The incident serves to emphasize the need of proper testing to safeguard life and property and three important points in connection with this fire deserve consideration:

1. The hose in question was not Underwriters' hose. It is reported to have been sold for Underwriters' hose and to have included in the price the Underwriters' charge of one cent per foot for inspection.

2. Before an Underwriters' label may be attached, each length of mill yard fire hose is tested at the hose factory under 300 pounds' pressure by an inspector of the Laboratories, and must be shown to withstand that pressure test before it may be used. The defective hose at Allentown did not bear this label and is reported to have burst at a pressure much less than the 300 pounds required.

3. The Laboratories' test is the direct opposite "of a game of graft." It is maintained under the direction of the National Board of Fire Underwriters in the interest of public safety at a large annual expense to the companies. The charges made for inspection are nominal and the work is not intended to, and does not, produce a profit.

Any product that can comply with the standard of its tests can secure its label, but no product will be labeled under any circumstances until it has withstood the rigid test necessary to prove its worth in time of need.

The lessons of this incident are twofold. In the first place, life and property may be, and often are, sacrificed to imperfect fire hose. In the second place, those who wish the security furnished by fire hose tested and passed by the Underwriters' Laboratories must make sure that each length bears a label certifying to such test. Without such label, any statement by any salesman to the contrary notwithstanding, the hose is not "Underwriters" hose.

New Fire Prevention Book

AN important addition to fire prevention literature has just been published by the Spectator Company, New York. It is entitled "Fire Prevention and Protection," by A. C. Hutson, a well-known fire protection engineer. Mr. Hutson is thoroughly conversant with the needs of those who are interested in the prevention and extinguishment of fire and is eminently qualified by training and experience to supply the information sought by all who are endeavoring to minimize fire hazards.

The book should be of wide general interest as it deals with hazards encountered in manufacturing and mercantile establishments of all kinds and gives much information concerning special hazards and the means of preventing and extinguishing fires. The volume contains important data concerning insurance regulations covering modern regulations on various hazards, with suggested improvements in building construction, fire prevention and extinguishment.

One particularly valuable feature of the book is the section devoted to "Fire Engine Tests and Fire Stream Tables." This is a reprint, by special permission, of a copyrighted pamphlet published by the National Board of Fire Underwriters, which is regarded as being a useful work for those connected with public and private fire departments. Other sections are those of Hazards, Construction and Protection, with numerous subdivisions under each head.

Digitized by Google

MATERIALS, APPARATUS, PROCESSES

IN THIS DEPARTMENT APPEAR REVIEW-ARTICLES ON PRODUCTS WHICH CONSERVE LIFE AND PROPERTY. THIS INFORMATION IS SECURED LARGELY FROM MANUFACTURERS. WE ACCEPT NO PAYMENT FOR ITS PUBLICATION

PATCHING CONCRETE FLOORS

In the article entitled "Patching Concrete Floors," published in a recent issue of SAFETY ENGINEERING, it should have been stated that the use of a mixture of asbestos fiber and rubber gum is not applicable to the repair of deep holes or large areas. Such patches are quickly made and give excellent results when confined to patches about one-eighth of an inch thick and where truck loads do not exceed one and a half tons, but when used on deep holes or on large areas they will not stand up and give satisfactory service. This method of patching concrete floors is of considerable value when rightly used.

SHEET METAL DOORS AND SHUTTERS

The importance of sheet metal doors and shutters as fire barriers is receiving more recognition from safety engineers, contractors, plant owners, etc., and is coming into wider use every day. A good specimen of this type of door and shutter is made by the Merchant & Evans Company, Philadelphia. The product of this company differs from other doors and shutters in that it is made entirely of metal. Instead of having a wood centre or core it has a steel frame centre which cannot rot or decay. In addition to making its standard type of product, known as the "Almetl" Fire Doors and Shutters, this company also makes doors and shutters to meet many unusual requirements, such as supplying its product made of galvanized American ingot iron or painting the inside surface of the panels with specified paint. It also supplies doors with well designed panel frame set into and securely bolted to the door, to hold wire glass. It makes doors with offsets to protect openings that have a mono-rail trolley track running through at the top; also doors shaped to properly fit into arched openings. The "Almetl" products have received the approval of the Underwriters' Laboratories, National, State and Municipal authorities, and others. A fine catalogue is issued by the Merchant & Evans Company, which may be had by writing the company at its Philadelphia office.

SHOCK ABSORBERS FOR EXCESSIVE NOISE

A great many employes have their hearing impaired or totally destroyed by the excessive noises in industrial plants. J. A. R. Elliott, 276 75th street, Brooklyn, N. Y., makes an ear protector which, although it admits all sounds to the ear, affords ample protection because it modifies the striking force to a moderate degree as the sound waves pass through. It provides for continued ventilation of the ear canal, and permits the normal pressure of atmosphere on the ear drum. It is highly recommended for use by engineers, machinists, chippers, riveters, boilermakers, and others who suffer from noise or dust entering the ears. These protectors are being used by various foreign military and naval establishments, by the American Navy and the U. S. Coast Artillery companies, for which service they have been adopted.

The body of this protector is of celluloid, provided with canals and by-ways, and held in place by two soft rubber disks. It is made in one size and will fit any ear. It can be worn with absolute comfort, for the ear is well ventilated, atmospheric pressure on the ear drum remains normal, and sounds of moderate force enter the ear without change; severe sounds and concussion of air are modified as they pass to the ear. A catalogue may be had for the asking.

SAFETY IN FORD PLANTS

The Ford Company issues a booklet each month entitled "For You," which it distributes among its employes. The subject of the booklet is devoted to "Safety, Health and Better Living." In a recent issue of this booklet we noticed the following very good instructions:

"Electricity is always dangerous, and great care should be used when working around it. All metal in the hands, such as oil cans, pliers, screw drivers and wrenches should be kept away from exposed places or carefully insulated. An electrician was standing on an iron wheelbarrow, replacing a fuse. He received a shock which caused him to fall, injuring his leg. He should have used a ladder, to be Safe. When using an electric drill or grinder, be sure

Digitized by Google

it has the special protecting tube near the handle. Many accidents are caused when the wires ground or break off because the protecting tube is not in place. If you do not understand just what to do when working around electricity, it is best not to experiment. Ask someone who knows. Be Safe. Those who operate mitre saws should be careful to keep the guards in place. Guards are put on machines to protect those who operate them. Men who have been hurt say, keep the guards in place and in turn they will protect you. Keep your saws in good condition. If not sharpened or properly reset they will bind and perhaps break, causing an injury. Using the guards and keeping tools and machines in good repair means Safety and Efficiency. New men should be allowed to work their first week on the day shift. For their own Safety they should never be put on nights when everything is new to them. Too many accidents come to our new men. We should do all we can to protect them and show them how to do their work safely. They can learn these things much better in the day time. Tennis shoes are a mighty poor Safety shoe for machine shop or foundry. Men are finding this out every day—after they have suffered a bad cut or a crushed toe. Better wear good, strongly built shoes and play Safe."

The distribution of this booklet to its employes enables the Ford company to keep down its accident list.

GOGGLE EXHIBIT AT THE NATIONAL ADVERTISERS EXPOSITION

T. A. Willson & Co., Inc., has leased a prominent space at the big National Advertisers Permanent Exposition on Garden Pier, Atlantic City, and will conduct an educational campaign in the use of Safety Glasses, as well as other types of Willson Goggles. A demonstrator is in continuous charge and will be pleased to show visitors a roster of Atlantic City dealers who sell Willson products. There are many interesting features in this exhibit, among which is the exhibit of all the medals awarded to this company in the various national expositions. This company publishes some interesting literature which it will be pleased to send, upon request to its Reading, Pa., office.

SAFETY SET SCREWS

The projecting heads of set screws have been the cause of a great many serious accidents and the use of set screws with projecting heads should be prohibited. Statistics show that in the United States alone over 1,500 persons are killed, or maimed for life, each year through this dangerous device. The Allen Manufacturing Company, 135 Sheldon Street, Hartford, Conn., manufactures a safety set screw which does not project. It is made from a high test steel bar by a patented process which strengthens the metal over 30 per cent. It will stand any pressure without being affected and may be tugged or pulled without injuring the threads or impairing its shape.

There has long been a need for a screw of this type, as the old type with the projecting head offers one of the most serious hazards with which safety officials are confronted. The company offers samples of its product for testing purposes; also its catalogue No. 22, upon request to the office.

H. W. JOHNS-MANVILLE CO. OPENS NEW BRANCH

The H. W. Johns-Manville Co. has just opened a new branch office at Great Falls, Mont., on the fourth floor of the Ford Building, Room 418, in charge of J. H. Roe. With the opening of the Great Falls office the Johns-Manville Co. increases its number of branches to fifty-five.

This new branch is made necessary by rapidly increasing business in this territory. Great Falls, with its rapidly growing population of 38,000, is not only one of the greatest hydro power centers of the United States, almost rivaling Niagara Falls, but is known as one of the best wheat growing sections in the country—its wheat taking first prize at the Panama-Pacific Exposition.

A SAFETY LIBRARY

Those engaged in accident and fire prevention work often feel the necessity of having a ready reference library on safety at hand. As SAFETY ENGINEERING is one of the most authoritative works on safety, it serves, most excellently, the purposes of a reference library. There is, however, some inconvenience in keeping all of the issues for a number of years back, ready to hand. To overcome this, we offer for sale a bound volume of the issues of SAFETY ENGINEERING for one year. These volumes are bound in leather and are indexed so that any article may be found in a few minutes without the inconvenience of having to go through six or seven copies of the magazine to find it. When bound in this way, the issues for several years do not take up as much space as when they are loose and they also make a very attractive shelf. The number of bound volumes on sale is limited and you should order your copy now so that you will be sure to have one.

TYPE "B" PULMOTOR

Artificial respiration is not new. The ancient Greek and Egyptian physicians are said to have attempted to restore respiration in the apparently drowned and asphyxiated by blowing the breath of life through reeds into the nostrils.

Today there are two recognized methods

Digitized by Google

of applying artificial respiration. These are the Manual Method as exemplified by the Schafer and Sylvester systems, and the Mechanical Method which requires the use of apparatus such as the Pulmotor.

Manual methods of resuscitation have undoubted value. Their use as a first-aid measure is to be urged while awaiting the arrival of a mechanical device. But it must be remembered that manual methods do not supply sufficient pulmonary ventilation, that the volume of air exchanges produced by these methods does not satisfy the needs of the patient.

Out of this defect spring others. Resuscitation becomes a test of strength and endurance. The operators must work in relays, and, since it is obvious that no two of them can employ precisely the same movements, one of the cardinal requirements of resuscitation is lost, namely, regularity. Equally apparent is the fact that manual methods cannot be employed on a patient who has sustained bone fracture, or who is suffering severe bruises or abrasions which frequently are accompanying results of the accident in which artificial respiration is employed. As a device for supplying adequate ventilation in cases of respiratory failure, whether from drowning or asphyxiation by noxious fumes and gases, the Pulmotor needs no introduction. The success of the Pulmotor disclosed the even greater possibilities for a smaller, lighter, hand-operated Pulmotor which could be operated independent of an oxygen supply. The result was a hand-operated device made by the Draeger Oxygen Apparatus Company, Pittsburgh, Pa., known as the Type "B" Pulmotor. The distinctive feature of this device is the employment of the principle of "measured lung pressures," made possible by means of the Pulmotor Pressure Control Valve. This valve provides a flexibility of control so positive that the operator can produce any combination of inhalation and exhalation pressures that the condition of his patient demands, regardless of the efforts of the man at the pump.

The great importance of this feature lies in the fact that patients of different ages and cases of different kinds require different lung pressures. The pressures for an infant should be less than those for an adult. The victim of electric shock must have his collapsed lung tissue expanded; the victim of asphyxiation must have his lungs cleared of poisonous gases. One will respond more quickly to a combination of high inhalation and low exhalation pressures, and another to a combination of low inhalation and high exhalation pressures.

It is impossible to injure lung tissue with this Pulmotor, for, no matter how great a pressure of air is stored in the pump-container, it cannot pass the Control Valve except in a controlled flow suited to the patient's needs. If there is an obstacle in the trachea, its presence is instantly signaled by the Indicator Gauges so that it may be removed instead of being forced into the lungs.

Another feature of the Type "B" is that the Indicator Gauges not only show the operator exactly what pressures are being exerted within the lungs, and when to change from either inhalation or exhalation, but they signal instantly the patient's first attempt to resume voluntary breathing. The operator may then time his efforts to those of the patient and assist him to full return of natural breathing. The patient can resume breathing through the machine while the mask is in place.

The Type "B" Pulmotor is adapted to the needs of every kind of case where resuscitation is required. It has been especially produced, however, for uses where the apparatus must be taken to the patient, and where economy of time is an important factor. An interesting booklet may be had by addressing the manufacturer.

UNDERWRITERS' LABORATORIES

Recent Approvals and Reapprovals

FRAMES. Single Type. Art Metal Fireproof Door & Trim Co., Inc., Mfr., 2724-26 Wentworth Avenue, Chicago, Ill. Frame consists of a head and jambs formed of steel channels; jambs provided with adjustable anchors for attaching to wall.

HOLLOW METAL FIRE WINDOW FRAMES. Forderer Cornice Works, Mfr., Portrero Avenue and 16th Street, San Francisco, Cal. Hollow metal fire window frames and sash for wired glass.

HOLLOW METAL FIRE WINDOW FRAMES. Garvin & Co., Sam, Mfr., 5124 Lake Street, Chicago, Ill. Hollow metal fire window frames and sash for wired glass.

HOLLOW METAL FIRE WINDOW FRAMES. Rysdon & Co., E. A. Mfr., 527 W. 41st Street, Chicago, Ill. Hollow metal fire window frames and sash for wired glass.

HOLLOW METAL FIRE WINDOW FRAMES. Sykes Co., The, Mfg., 930 W. 19th Place, Chicago, Ill. Hollow metal fire window frames and sash for wired glass.

HOLLOW METAL FIRE WINDOW FRAMES. Voigtmann & Co., Mfr., 459 W. Erie Street, Chicago, Ill. Hollow metal fire window frames and sash for wired glass.

HOSE. Rubber Lined. Diamond Rubber Co., Submittor, Akron, O.

INSIDE HAND-OPERATED DISCHARGE DEVICE. American Steel Products Co., Submittor, 403 N. Dudley Street, Macomb, Ill.

INSIDE, HAND-OPERATED, DISCHARGE DEVICES. Gilbert & Barker Mfg. Co. Mfr., Springfield, Mass.

INSULATING MATERIALS. Johns-Manville Co., H. M., Mfr., Madison Avenue and 41st Street, New York, N. Y. A homogeneous product made from relatively dry, compounded stock moulded under high pressure.

LADDER FEET. Chesebro-Whitman Co., Inc., Mfr., 64th Street and First Avenue, New York, N. Y.

PLYMOUTH GYPSUM BLOCKS FOR CORRIDOR AND ROOM PARTITIONS. Plymouth Gypsum Co., Mfr., Fort Dodge, Ia. Factory at Fort Dodge, Ia.

Digitized by Google

SAFETY ENGINEERING

THE MAGAZINE OF SAFETY

SAFETY ECLIPSING DANGER

Adjustoglas
TRADE MARK

NO WONDER HE SMILES!!

Adjustoglas
TRADE MARK

HAS SAVED HIS EYE

Adjustoglas goggles are guarding thousands of eyes each day in industrial plants, railroads and mills.

Men don't refuse to wear Adjustoglas goggles because they do not interfere with their work, furnish real protection and are absolutely comfortable.

Adjustoglas is the first choice in a large number of concerns among which are the Baltimore & Ohio R.R., Queen & Crescent Route, Cramp Ship Building Co., and E. I. Du Pont De Nemours & Co.

If you have not investigated the many superior features of the Adjustoglas send for a sample and catalog to-day.

Don't merely approve goggles: specify Adjustoglas

THE STRONG KENNARD & NUTT CO.

511 Schofield Bld., Cleveland, Ohio

Digitized by Google

DON'T LET THIS HAPPEN TO YOUR PLANT

It was a weak little fire at first—needing only a few pumps of Pyrene to stop it dead.

But there was no Pyrene there. And so the fire grew, engulfed the whole building, put plant, machinery and stock out of commission, swept away the company's contracts and good-will. This need never happen to your factory with Pyrene so handy.

Nearly 1,000,000 Pyrenes in use.

Inspected, approved and labeled by the Underwriters' Laboratories, Inc.

PYRENE MANUFACTURING CO.

52 Vanderbilt Ave., New York

Makers of a complete line of Fire Protection Appliances

Digitized by Google

KING'S SAFETY GOGGLES

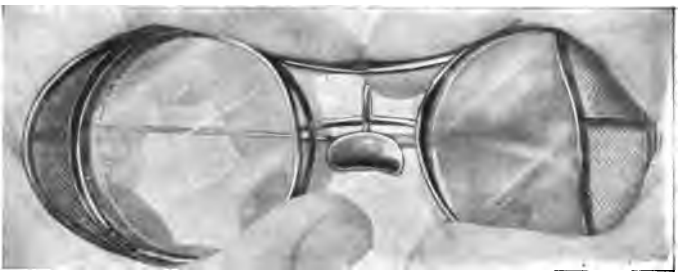


FIG. I

King's I-SAFE with SANIGLAS Lenses

One size adjustable to the face of the largest man or *smallest* boy

For a broad face, pull goggles apart as shown in Fig. 1. This will give the result shown in Fig. II. If a narrow face, bend frame and lenses toward each other. This will give result shown in Fig. III.

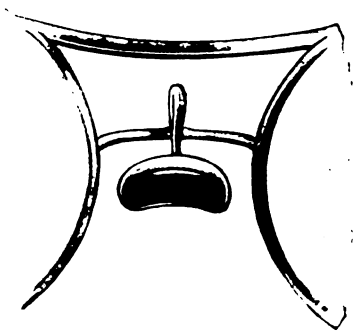


FIG. II
Adjusted for Wide Face

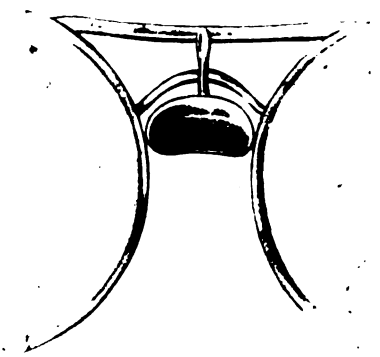


FIG. III
Adjusted for Narrow Face

The adjustable nose piece can be bent with the thumb and fingers to raise or lower the goggles and to set them nearer to or farther from the eyes.

JULIUS KING OPTICAL COMPANY

10-12 MAIDEN LANE
NEW YORK, N. Y.

7 W. MADISON ST.
CHICAGO, ILL.

Digitized by Google

Nothing Succeeds Like Power's Cameragraph 6B

For Educating The Men In SAFETY

The motion picture is the most effective of all educational mediums. The men instantly perceive what would otherwise require hours of laborious mental application to master. Faultless projection of the pictorial subjects is most essential to successful results in this field.

PERFECT PROJECTION

is attained through the use of

Power's Cameragraph No. 6B

USED BY

Public Service Corp., Newark, N. J.
Brooklyn Rapid Transit System, 85 Clinton St., Brooklyn, N. Y.
Santa Fe R. P.
N. Y. Central, Hudson R. R. R., Safety Department.
The Lathrop Coal Company, Panther, W. Va.
Prudential Insurance Co., Newark, N. J.
Stag Canon Fuel Co., Dawson, New Mexico.
Grand Trunk Railway System, Montreal, Quebec, Can.
Rock Island Lines, Safety Bureau, La Salle St. Sta., Chicago, Ill.
Department of Interior, Bureau of Mines, The Mine at Panama-Pacific Exposition.
Homestake Mining Company, Lead, S. D.
New York Edison Co., Photographic Dept., N. Y. C.

New York Edison Company, Irving Place & 15th St., New York City.
American Museum of Safety, 18 West 24th St., N. Y. C.
Ford Motor Company (of Can.), Ford, Ont., Can.
McClure Publications, Inc., New York City.
Ford Motor Company, Detroit, Mich.
Erie Railroad Company, Dunmore, Pa.
Ford Motor Company, Detroit, Mich.
Philadelphia & Reading Coal & Iron Co., Pottsville, Pa.
The National Cash Register Company, New York City.

and many others.

Nicholas Power Company

Ninety Gold Street New York City

Digitized by Google

SAFETY ENGINEERING

THE MAGAZINE SAFETY ECLIPSING DANGER OF SAFETY

King "Arkweld" Helmet

FOR

Electric Welding

Absolute Protection from Intense Light and Heat
Standardized by the Leading Industrial Plants

MANUFACTURED EXCLUSIVELY BY

JULIUS KING OPTICAL COMPANY

NEW YORK:
10-12 Maiden Lane

CHICAGO:
7 West Madison Street

Digitized by Google

ÆTNA SERVICE

Any of the Above Publications Mailed to Ætna Policyholders on Request.

ACCIDENT PREVENTION SERVICE IS ONE OF THE MANY THINGS WHICH MAKE ÆTNA WORKMEN'S COMPENSATION INSURANCE THE MOST VALUABLE.

Ætna Life Insurance Company
The Ætna Accident & Liability Co.

Hartford, Connecticut

Digitized by Google

Remember You Saw This in Safety Engineering

SAFETY ENGINEERING

THE MAGAZINE SAFETY ECLIPSING DANGER OF SAFETY

SIC

"PIONEER" OVERHEAD MEANS SAFETY UNDERNEATH

INDUSTRIAL REQUIREMENTS OF TO-DAY DEMAND STEEL

Steel stands for Strength and Safety. Steel withstands shock, strain, hard and long service more successfully than any other material and that is why PIONEER STEEL SHAFT HANGERS are made of unbreakable open hearth steel.

STANDARD PRESSED STEEL CO.
PHILADELPHIA, PA.

Digitized by Google

Pyrene
FIRE EXTINGUISHERS

IS YOUR STOCK-ROOM SAFE FROM FIRE?

A penny saved may mean a dollar burned —if you neglect to equip your stock-room with Pyrene.

Pyrene kills fires instantly—keeps them from becoming conflagrations or holocausts. Destroys nothing but flame. Won't mar or corrode the valuable contents of your stock-room bins. Light and convenient to operate. A woman or boy of ten can use it. Instantly ready, never in the way. Won't freeze or deteriorate. No upkeep cost.

Saves 15 per cent on auto insurance premiums each year.

$7.50 each, complete with bracket.

Inspected, approved and labeled by the Underwriters' Laboratories, Inc. Nearly 1,000,000 in use. Sold by hardware and auto supply dealers.

Pyrene Manufacturing Company

Makers of a Complete Line of Fire Appliances
52 Vanderbilt Avenue, New York City

Remember You Saw This in Safety Engineering

Google

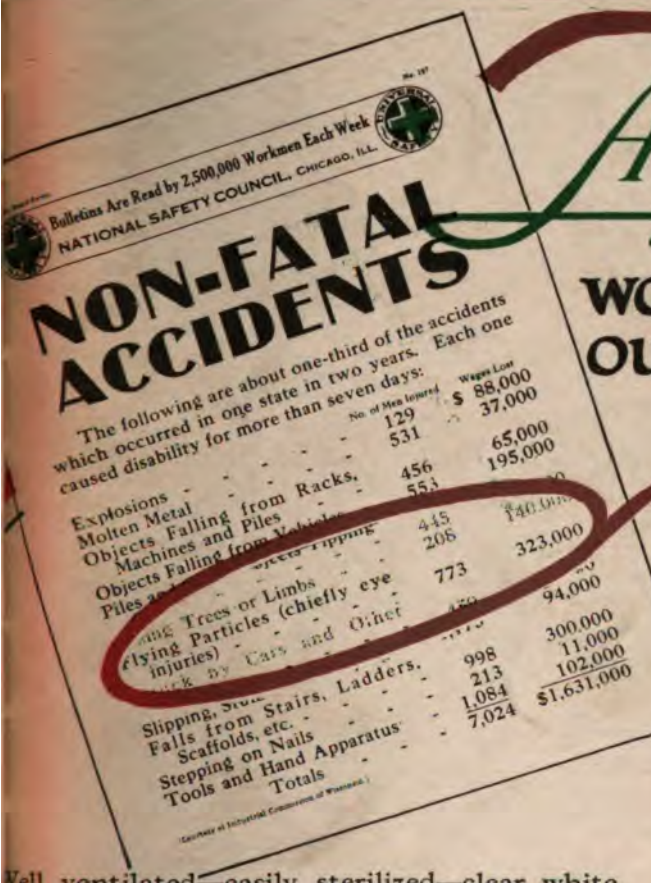
XXIII. No. 4 OCTOBER, 1916 25 Cents

SAFETY ENGINEERING

ATIONAL SAFETY
OUNCIL CONGRESS
ETROIT — OCT. 17-20

SAFETY ECLIPSING DANGER

SAFETY EXHIBIT
DETROIT ARMORY
DETROIT — OCT. 16-21


Bulletins Are Read by 2,500,000 Workmen Each Week
NATIONAL SAFETY COUNCIL, CHICAGO, ILL.
NON-FATAL ACCIDENTS
The following are about one-third of the accidents which occurred in one state in two years. Each one caused disability for more than seven days:
No. of Men Injured
Wages Lost
Explosions 129 $ 88,000
Molten Metal 531 37,000
Objects Falling from Racks, Machines and Piles 456 65,000
Objects Falling from Vehicles 553 195,000
Piles 445
Flying Trees or Limbs 208 $40,000
Particles (chiefly eye injuries) 773 323,000
Struck by Cars and Other 94,000
Slipping, Stumbling 998 300,000
Falls from Stairs, Ladders, Scaffolds, etc. 213 11,000
Stepping on Nails 1,084 102,000
Tools and Hand Apparatus 7,024 $1,631,000
Totals

Adjustoglas

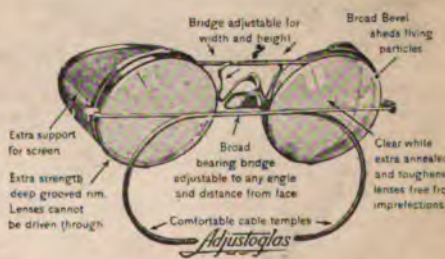
TRADE MARK

would have wiped out this item

NOTE: Eye accidents cost more than any other class of accidents —and were second largest in number and loss of time.

ADJUSTOGLAS—the safety comfort goggle—prevents eye accidents. Adjustable to comfortably fit any size or shape of face.

Well ventilated—easily sterilized—clear white optical glass, specially toughened—made to withstand hardest service conditions.


Bridge adjustable for width and height
Broad Bevel sheds flying particles
Extra support for screen
Broad bearing bridge adjustable to any angle and distance from face
Clear white extra annealed and toughened lenses free from imperfections
Extra strength deep grooved rim. Lenses cannot be driven through
Comfortable cable temples
Adjustoglas

Look for the name *Adjustoglas* TRADE MARK stamped on each goggle

Samples and catalogue on request

Be sure to visit our booth at the Detroit exhibit

Don't merely order goggles. Specify Adjustoglas

THE STRONG KENNARD & NUTT CO.

Digitized by Google

ÆTNA SERVICE

Any of the Above Publications Mailed to Ætna Policyholders on Request.

ACCIDENT PREVENTION SERVICE IS ONE OF THE MANY THINGS WHICH MAKE ÆTNA WORKMEN'S COMPENSATION INSURANCE THE MOST VALUABLE.

Ætna Life Insurance Company
The Ætna Accident & Liability Co.

Hartford, Connecticut

Digitized by Google

SAFETY ENGINEERING

THE MAGAZINE SAFETY ECLIPSING DANGER OF SAFETY

No Protection

Adjustoglas
TRADE MARK

The Safety—Comfort Goggle

Adjustoglas
TRADE MARK

Adjustoglas Goggles remove eye hazards and eye problems. Simply providing 'goggles' is not enough. Men who *will not* wear ordinary goggles *will* wear Adjustoglas goggles.

Increasing numbers of National Safety Council Members are approving the use of Adjustoglas because they provide the required eye protection for factory, mill, foundry, railroads and other industries. If you have not investigated the merits of this cool, comfortable, adjustable goggle send for a sample and full information today.

See that the name Adjustoglas is stamped on the rim of the goggles you use

Don't merely order goggles: Specify Adjustoglas

THE STRONG KENNARD & NUTT CO.
511 Schofield Bld., Cleveland, Ohio

Digitized by Google

Pyrene
FIRE
EXTINGUISHERS

IT'S USUALLY TOO LATE WHEN THE ENGINES ARRIVE

If your plant catches fire tonight, will your watchman start fighting that fire instantly, intelligently and scientifically —or must he stand helplessly by and wait, after turning in the alarm?

Pyrene enables him to put out fires before the engines can get there. Pyrene quenches all fires—including electrical, oil, and gasoline—before they get big. Won't freeze or deteriorate. An unskilled workman can use it. Damages nothing but flame.

Inspected, approved, and labelled by the Underwriters' Laboratories, Inc.

Over 1,000,000 in use—sold by hardware and machinery supply dealers.

PYRENE MANUFACTURING COMPANY
52 Vanderbilt Avenue, New York City
Makers of a Complete Line of Fire Appliances

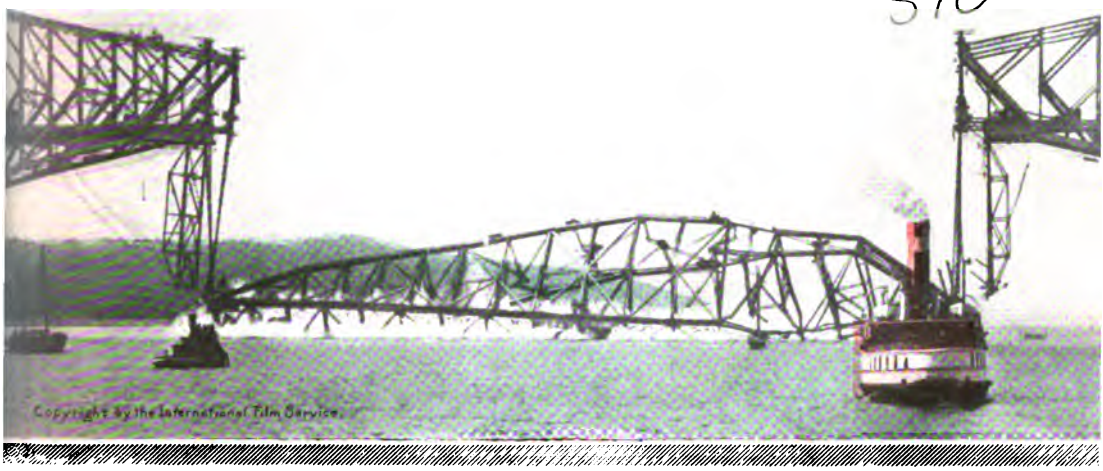
Remember You Saw This in Safety Engineering

Digitized by Google

Vol. XXXII. No. 6 DECEMBER, 1916 25 Cents

SAFETY ENGINEERING

THE MAGAZINE SAFETY ECLIPSING DANGER OF SAFETY



Why Did the Span Collapse?

Everything—stresses, strains, weights, loads—had all been figured out. The engineers knew the calculations were correct, that they were within the margin of SAFETY, in every detail—yet—down came the span. Why? Because a "rocker" casting broke, due to a hidden weakness.

It's the same old story of misplaced confidence in treacherous castings, treachery caused by blow-holes, cooling strains and a number of other causes, all beyond human ken.

And there's always that uncertainty about cast metal, whether you put it into bridges or shaft hangers.

"Pioneer" Hangers can have no such defects, on account of being made of rolled, open hearth STEEL, pressed to shape. And that's why the "Pioneer" is absolutely Unbreakable and SAFE, Light and Handy.

And as to price—it costs no more than cast hangers. Think it over, then specify the "Pioneer" as thousands of others do.

Our new booklet—"Transmission Data" is well worth your reading. Send for a copy.

"PIONEER" STEEL HANGERS NEVER BREAK

STANDARD PRESSED STEEL CO.

PHILADELPHIA

Digitized by Google

ÆTNA SERVICE

Any of the Above Publications Mailed to Ætna Policyholders on Request.

ACCIDENT PREVENTION SERVICE IS ONE OF THE MANY THINGS WHICH MAKE ÆTNA WORKMEN'S COMPENSATION INSURANCE THE MOST VALUABLE.

Ætna Life Insurance Company
The Ætna Accident & Liability Co.

Hartford, Connecticut

Digitized by Google

Remember You Saw This in Safety Engineering

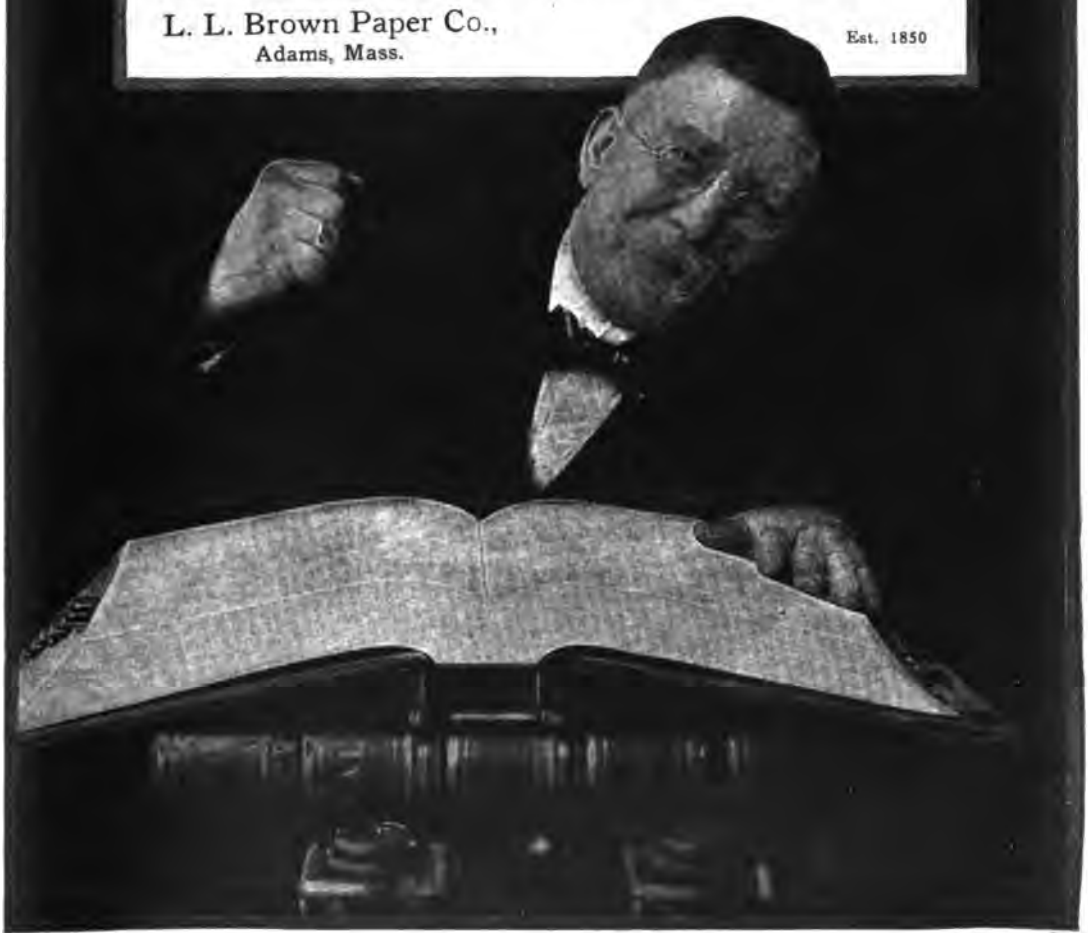
Brown's Linen Ledger Paper

"I want 'Brown's'"

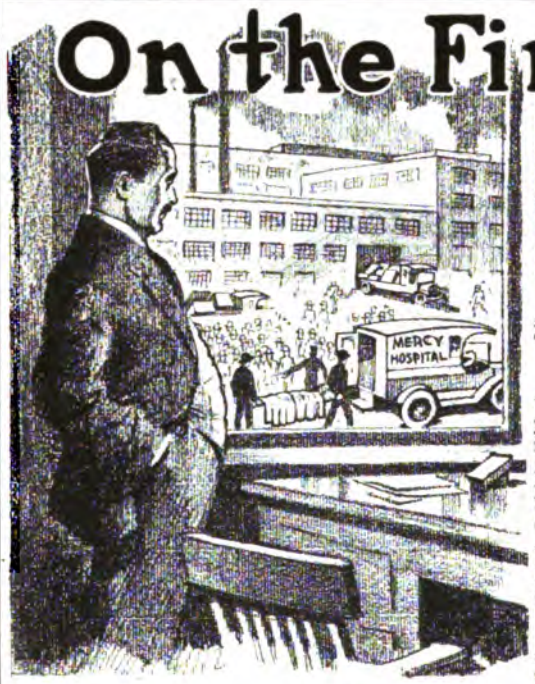
THIS is the demand of every one who knows paper, of every bookkeeper who has ever used it, of state, county and city governments, of the leading banks and insurance companies, and of big business interests generally.

Brown's Linen Ledger Paper is universally preferred because it is unfailingly reliable. It never grows yellow or deteriorates from age. It gives perfect preservation of records for ages. Its fine writing qualities make for better bookkeeping. It pays to demand Brown's for your ledgers and record books. Write for Sample Book today.

L. L. Brown Paper Co.,
Adams, Mass.

Est. 1850

Digitized by Google

On the Firing Line



WHEN a man is hurt or killed in your plant—you stop and think—"how did it happen?" "What can we do to prevent such accidents?"

If you see the result—eyes burned out—hands badly burned or the poor fellow suffering in agony, or quiet as death, you then realize that you are the guardian of your men, and morally responsible for their welfare.

When you get on the firing line you understand the horrors of war. When you rub elbows with your men you grasp the true meaning of "Safety First" and its importance.

When you rub elbows oftener with your men you will know that all open knife switches in your plant should be enclosed. That the very warning signs on such switches should come down—that it is best for you and your company to tear these signs up and throw out the open knife switch death traps, replacing them with *"Square D" Steel Enclosed Switches.*

"Square D" Steel Enclosed Switches will prevent accidental contact with live parts. The switch is completely enclosed in a steel box and operates from the outside by a crank handle. Wherever the point of control (the switch) of an electrical installation is safeguarded by a "Square D" Steel Enclosed Switch, the "human" element, responsible for nearly 75% of all accidents, is reduced to a minimum.

"Square D" Steel Enclosed Switches save their first cost of installation many times because they will lower Workman's Compensation losses, reduce fire hazards and regulate factory insurance.

They are officially sanctioned by the highest authorities on fire and accident prevention and bear the new official Fire and Accident Label of the Underwriters' Laboratories and Workman's Compensation Bureau.

Managements of the smallest factory or the largest corporation can show real profits from the installation of "Square D" Steel Enclosed Switches.

Bulletin 37-A, giving complete information and prices, should be on the desk of every man interested in industrial fire and accident prevention—send for it today.

"Square D" Steel Enclosed Switch for Industrial Electrical Safety

DETROIT FUSE & MFG. COMPANY

1410 Rivard Street

Detroit, Michigan

Electrical Safety

BRANCHES: New York, Chicago, Birmingham, Denver, San Francisco, Walkerville, Ont., Toronto, Ont.

Digitized by Google

Safety Engineering

Three publications have been combined with Safety Engineering:
FIRE PREVENTION, CONSERVATION and PROTECTION ENGINEERING

FRANKLIN WEBSTER, Editor.

RUFUS W. HICKS, JR., Associate Editor A. C. CARRUTHERS, Adv. Mgr.

Published monthly by THE SAFETY PRESS, Inc., 80 Maiden Lane, New York. Franklin Webster, President. Carl M. Hansen, First Vice President. A. C. Carruthers, Second Vice President. M. L. Dewsnap, Treasurer. Albert C. Trego, Secretary. Entered as Second Class Matter at the New York Post Office.

CONTENTS FOR DECEMBER, 1916

FIRE PREVENTION DAY IN NEW YORK CITY (Frontispiece).... 321

KILLED AND INJURED IN FIRES IN 1916..... 322

SAFETY FOR PUBLIC SCHOOLS.....By Robert Adamson.... 327
Illustrated with Photographs of the New York Fire Department Parade on Fire Prevention Day.

SAFETY IN SOUTHERN COTTON MILLS.By G. D. Bragdon.... 335

WELFARE WORK.....By E. E. Bach.... 337

METAL MINE ACCIDENTS AND THEIR PREVENTION By Professor F. W. Sperr.... 339

STREET TRAFFIC REGULATION IN RELATION TO PUBLIC SAFETY.....By W. P. Eno.... 341

THE PREVENTION OF ACCIDENTS.....By R. C. Richards.... 342

RAILROAD ACCIDENT PREVENTION..By Marcus A. Dow.... 345

AMERICAN MUSEUM OF SAFETY..... 347
Arthur H. Young, the New Director.

SAFETY IN BESSEMER OPERATIONS.....By J. H. Ayres.... 348

FREIGHT ELEVATORS—THEIR USE AND HOW TO PREVENT ACCIDENTS.....By J. H. Wright.... 350

EDITORIAL 351
Motion Picture Theater Safety. A Safety Commissioner.

POLICE AND FIRE.....By G. W. Atwood.... 352

ALCOHOL VERSUS SAFETY.....By Dr. J. P. Hourigan.... 355

SAFETY FROM THE ECONOMIC VIEWPOINT By B. Frank Day.... 357

EMPLOYMENT, MEDICAL SUPERVISION AND SAFETY By L. A. Phelps.... 359

(Continued on next page.)

Digitized by Google

CONTENTS FOR DECEMBER, 1916 (Continued)

THE GOGGLE PROBLEM IN THE CHEMICAL INDUSTRY
By J. R. de la Torre Bueno.... 361

RAILROAD'S NEW SAFETY CALENDAR..... 362

HEALTH EDUCATION.....By Dr. L. G. Shoudy.... 363

POSSIBILITIES OF PUBLIC SAFETY WORK
By Edward C. Spring.... 365

ELECTRIC HAZARDS.....By D. M. Petty.... 366

CLASSIFICATION OF HAZARDS IN EXPERIENCE RATING
Note by Arne Fisher on an Application of Bayes' Rule.... 368

HAZARDS OF ELECTRIC PRESSING IRONS..... 370
Bulletin of National Fire Protection Association.

THE MAN ON THE JOB 371
An Impressive Safety Lesson. Advertising the "Safety First" Idea. Harmony—Safety. Maintaining Interest in Accident Prevention. Putting "Ginger" in Safety. Comments by Members of the Committee. Prizes for November Articles.

EYE PROTECTION.....By F. W. Shepard.... 377

NEW YORK'S SAFETY MEETING..... 379
Local Council of National Safety Council.

WHAT IS "INSPECTED" FIRE HOSE?..... 380

NEW FIRE PREVENTION BOOK..... 381

MATERIALS, APPARATUS, PROCESSES..... 382

UNDERWRITERS' LABORATORIES 384
Recent Approvals and Reapprovals.

SUBSCRIPTIONS. Three dollars a year in advance. In Canada, $3.50. Foreign subscription, $4.00. Single copies, 25 cents.
REMITTANCES. Should be by draft on New York, postal money order or express order, payable to The Safety Press, Inc.
BOUND VOLUMES. Two volumes a year (bound in one book) $5.00, carrying charges to be paid by the purchaser. Subscriber's copies in good order, returned in full sets, will be credited 25 cents per copy in exchange for bound volumes. All carrying charges to be paid by the subscriber.
INDEX. An index is prepared for each volume of Safety Engineering which may be obtained by subscribers upon application.

THE SAFETY PRESS, Inc., 80 Maiden Lane, New York

Digitized by Google

A BUILDING IS NOT FIREPROOF UNLESS ALL THE WINDOW OPENINGS ARE PROTECTED

WIRE GLASS

is the best window protection against serious exposure fires. Set in approved metal frames, the one essential feature necessary to render a modern "fireproof" building **really fireproof** is furnished.

Protection is afforded on **all four** sides of the building.

Wire Glass windows are closed **most** of the time; if not, can be quickly closed. Wire Glass is translucent; fire may be seen from the outside. Resists rust, exterior only exposed. Presents a solid surface, no openings for flames or drafts. There are many other points, told of in our bulletins, showing clearly **why** your glazing should be Mississippi Wire Glass. Let us send our descriptive catalogue, Report on Diffusion of Light, and samples.

MISSISSIPPI WIRE GLASS CO.

222 FIFTH AVE., NEW YORK

7 W. Madison St., Chicago, Ill.

4070 N. Main St., St. Louis, Mo.

Digitized by Google

THE SAFETY COMFORT GOGGLE

Adjustoglas TRADE MARK

Men Who Won't Wear Goggles Will Wear *Adjustoglas* Protectors

TRADE MARK

The Adjustoglas Eye Protector will be worn. It is cool, comfortable, and does not interfere with sight or vision. It can be adjusted to fit each individual requirement. No pinching or cutting of the nose, the weight is distributed and borne on the bony structure of the nose. The broad bearing bridge can be adjusted to any distance and angle from the face, and the bridge is adjustable for width and height. The clear white extra annealed and toughened lenses are optically perfect—do not cause headaches or eye strain. One size Adjustoglas Eye Protector will fit any size, shape or contour of head. No need of investing in sizes you never will use.

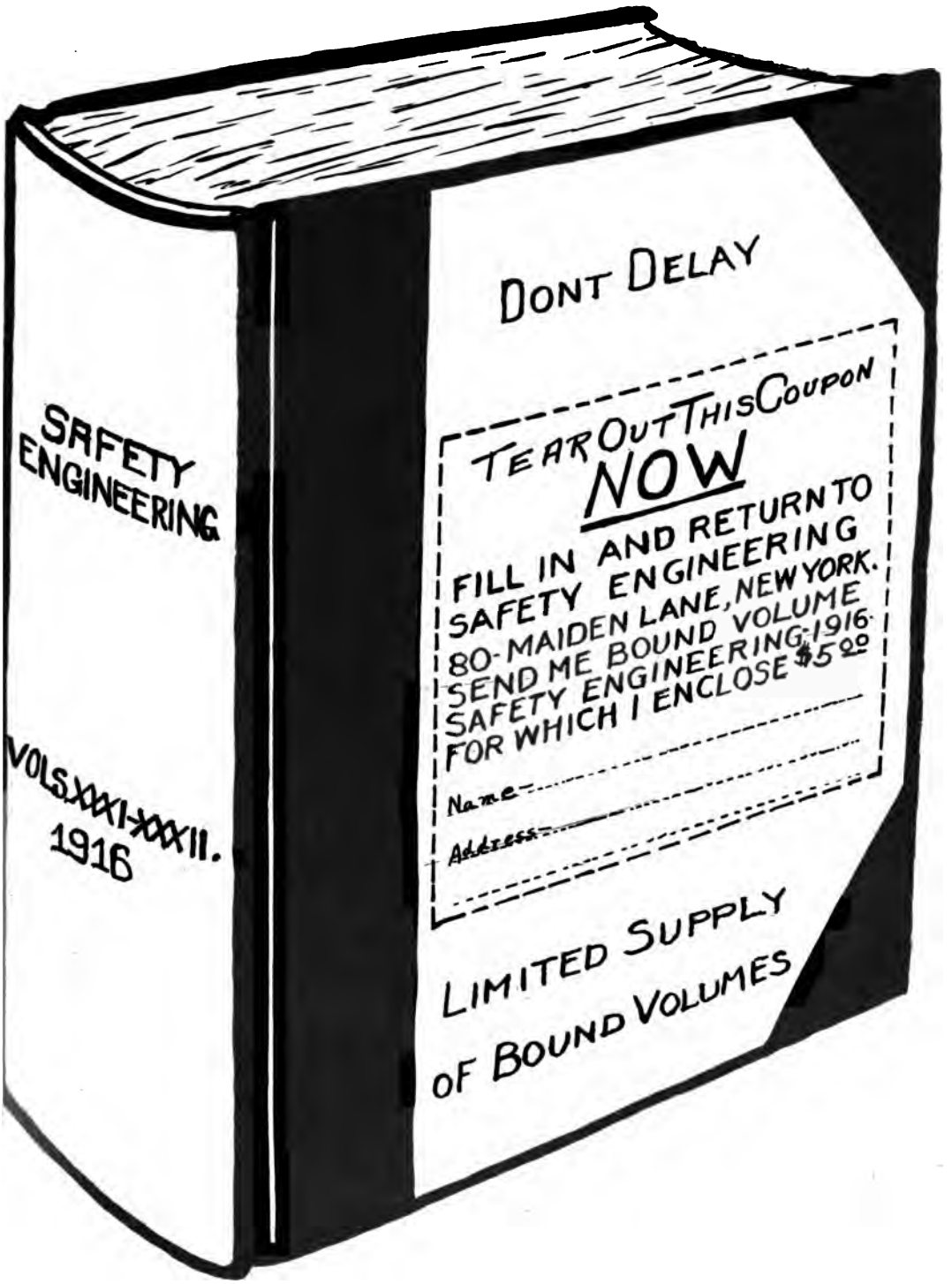
Due to the high grade of materials used in the manufacture of Adjustoglas Goggles, they possess maximum goggle strength and give greatest protection. They withstand hard usage.

There is an Adjustoglas for every industrial eye protection need. What is yours?

THE STRONG, KENNARD & NUTT CO.

511 SCHOFIELD BLDG. CLEVELAND, OHIO

Digitized by Google



Digitized by Google

ADVERTISERS IN THIS ISSUE

A

Allen Mfg. Co. 43
Aetna Insurance Co. Front inside cover
American-La-France Fire Engine Co. 42

B

Badger Fire Extinguisher Co..... 30
Barrett Company, The..... 29
Bernstein Mfg. Co..... 9
Books 36, 37
Brown, L. L., Paper Co..... 1

C

Childs, O. J., Co..... 42
Consolidated Engine-Stop Co..... 30

D

Detroit Fuse & Mfg. Co..... 2
Draeger Oxygen Apparatus Co.... 20

E

Eastman, Samuel, Co..... 41

G

Gamewell Co., The..... 43
Garnett, Herbert 41

H

Hardy, F. A., & Co..... 17
Hartford Accident & Indemnity Co. 16
Hartford Fire Insurance Co..... 16
Hausburg, E. O. 34
Home Insurance Co..... 38
Howard Clock Co., E..... 42

J

Johns-Manville, H. W., Co..... 34

K

Keasbey & Mattison Co..... 19
King, Julius, Optical Co.....3d Cover
Kny-Scheerer Corp. 40
Koven, L. O., & Bro..... 39
Krantz Mfg. Co..... 18

L

London Guarantee & Accident Co.. 35

M

Man-on-the-Job 10, 11
McLauthlin, Geo. T., Co..... 40
Maurer, Henry, & Son..... 33
Merchant & Evans Co..... 44
Mississippi Wire Glass Co..... 5
Multi-Metal Separating Screen Co.. 15
Mundt, Charles, & Sons..... 38

N

National Safety Council..... 32
Northern Assurance Co..... 34
Norton Co. 43

O

Oxweld Acetylene Co..... 14

P

Peters, Jas., & Son..... 35
Power, Nicholas Co.....4th cover

S

Safety First Supply Co..... 13
Safety Wrench & Appliance Co..... 35
Springfield F. & M. Insurance Co.. 39
Standard Pressed Steel Co. Front Cover
Stonehouse Steel Sign Co., The.... 35
Strong, Kennard & Nutt Co..... 6

T

Travelers Indemnity Co., The..... 12
Travelers Insurance Co., The..... 12

U

U. S. Mineral Wool Co..... 38

W

Wants 35
Williams Improved Stretcher Co... 40
Willson, T. A., & Co., Inc..... 9
Wood, R. D., & Co..... 41

Digitized by Google

Your men prefer to wear comfortable Safety Glasses

Willson eye protection is designed to be worn—day in and day out—with everlasting comfort. The patented brace bridge, which makes Willson Goggles adjustable, never touches any part of the face. This construction can't mark tender noses and permits ordinary glasses to be worn underneath. The Willson patented safety flange reduces eye injury to a minimum. Consider these safety essentials in selecting *your* eye protection.

Style SSG2N
For chippers

$10.25 per doz.
$1.75 per pair

The Willson Safety Glass List will be mailed upon request

T. A. WILLSON & CO., INC.

Manufacturers of standard eye protection and contractors to the War Department

Factory and Main Offices, Reading, Pa.

Chicago: Mallers Bldg. **San Francisco: Head Bldg.** **Toronto: 23 Scott St.**

Accidents will happen despite the best precautions. Be prepared with a

"FIRST AID ROOM"

A practical First Aid Room is regarded a necessity by men who have studied Modern Industrial Conditions.

Bernstein standard Hospital Equipment has been adopted for First Aid Room purposes by corporations like Youngstown Sheet & Tube Co., Bethlehem Steel Co., Revere Rubber Co., Chevrolet Motor Car Co., New Jersey Zinc Co., Barret Mfg. Co., and many others.

Illustration shows an ideal lasting and inexpensive installation, suggested by us. It can be placed in 135 sq. ft. of space. It will give you all the facilities of a small hospital at your own plant. It will materially reduce your compensation Insurance premiums. It will pay for itself. Send for descriptive folder F. A. and prices.

Bernstein MANUFACTURING COMPANY

3rd and Allegheny Ave., Philadelphia, Pa.

Makers for 30 years of Aseptic Steel Hospital Equipment, Steel Lockers and Shelving, Sterilizers, Beds and Bedding.

Digitized by Google

Every Man In Your
This "Man-on-

The cooperation of your men is *you must have* to reduce your section of Safety Engineering is Officials the most valuable means men. The "Man-on-the-Job" practical—largely writte[illegible] by in requests, Safety Engineering has Job" section each month, for

For 350 or less 8-page pamphlets
" 350 " " 12- " "
" 500 " more a slightly lower

SEND YOUR

Safety Engineering, 80

Digitized by Google

Plant Should Have the-Job" Pamphlet

what you want. *Cooperation is what* accidents. The "Man-on-the-Job" considered by a great many Safety of securing the cooperation of the articles are short, up-to-the-minute, dustrial men. In response to many decided to reprint the "Man-on-the-distribution in industrial plants.

- - - - - - - - - $4.00 per 100
- - - - - - - - - 6.00 " 100

rate can be quoted.

ORDER NOW

Maiden Lane, New York

Digitized by Google

COMPENSATION INSURANCE AND PREVENTION OF ACCIDENTS

The compensation policies of The Travelers Insurance Company afford the most complete coverage, satisfying the responsibilities of the insured under the compensation law.

These policies also provide as the result of over twenty years' experience an unequaled service of inspection and safety engineering for the prevention of industrial accidents in plants as diversified as a list of American industrial achievements.

In 1914 The Travelers made over 162,000 inspections for the elimination of industrial accidents.

TRAVELERS' SERVICE PROVIDES:

INVESTIGATION OF PLANTS AND EQUIPMENT,
ADVICE AS TO THE ELIMINATION OF DANGER POINTS,
INSTALLATION OF EFFICIENT AND ECONOMIC SAFETY DEVICES,
HANDLING AND STORAGE OF MATERIALS,
FACTORY METHODS AND SUPERVISION.

The prevention of accidents is the most essential factor in reducing the cost of compensation insurance.

The Travelers is the greatest accident and compensation Company in the world.

THE TRAVELERS INSURANCE COMPANY
HARTFORD, CONN.

STEAM BOILER INSURANCE

A Steam Boiler policy in The Travelers Indemnity Company carries with it an inspection service of the highest order. It entitles the insured without further cost to analysis of troublesome feed waters and to expert advice upon any problem that may arise in the boiler plant. Also insures prompt adjustment and liberal indemnity in case of explosion.

THE TRAVELERS INDEMNITY COMPANY
HARTFORD, CONN.

Digitized by Google

A NECESSITY FOR YOUR PLANT

With a daily average of 810 Industrial Accidents occurring in only one of our States, this Emergency Hospital Equipment is an absolute necessity. Combined with enough beds for a ward and Furniture necessary for a Receiving Room, it will fulfill all the requirements of a Three Room Hospital.

DIAMOND EMERGENCY HOSPITAL EQUIPMENT NO. 1

consists of:

FURNITURE:

- 1 U. S. Operating Table
- 1 Stand with Two Porcelain Shelves
- 1 Steel Wall Cabinet with Mirror
- 1 Single Basin Stand with Basin
- 1 2-Quart Pitcher
- 1 Steel Chair with Back
- 1 Steel Stool
- 1 Sterilizer with Stand

Every item listed above is of heavy steel construction and heavily coated with white porcelain enamel.

ACCESSORIES:

- 5 pkgs. Plain Sterile Gauze, 1 yd. pkgs.
- 1 Jar Iodoform Gauze—5%
- 1 Doz. 1" Gauze Bandages
- 1 Doz. 2" Gauze Bandages
- 1 lb. Absorbent Cotton, 4 oz. pkgs.
- 1 Roll Z. O. Adhesive Plaster, 1" wide
- 1 Jar Plain Sterile Catgut, 3 sizes
- 1 Jar Plain Sterile Silk, 3 sizes
- 1 Scalpel
- 2 Pean's Haemostats
- 1 Doz. Needles, Assorted
- 1 Pair Scissors, straight
- 1 Gross Safety Pins—medium

The Accessories in the above list are of the best materials obtainable and are guaranteed to be the necessities for First Aid

We guarantee this Outfit to meet all the requirements of the Insurance Companies and the Compensation Law.

Mail us your order for one today.

Concentrate your purchases

Price Complete $70.

SAFETY FIRST SUPPLY COMPANY

PITTSBURGH PENNSYLVANIA

Remember You Saw This in Safety Engineering

Digitized by Google

Dodge the Handling Hazard!

Take the tool to the work!

Crane—Trucking—Adjusting—Sawing—then readjusting for each cut—every one of these operations carries a hazard where the old-fashioned saw methods are practiced. How much better and safer to

Cut Sprues, Gates and Risers with

OXWELD BLOWPIPE

It's the modern, safe, economical way—as easy to handle as an air-chisel. Most every large steel mill now uses Oxweld Equipment. One large manufacturer says the Oxweld Blowpipe saves him twelve cents a ton on his entire output.

Oxweld Process is one that every safety engineer should know thoroughly. It is the original (and the only) "Low Pressure" system, amply safeguarded in every way. We'll gladly tell you all about it if you'll give us an opportunity.

OXWELD ACETYLENE COMPANY

NEWARK, N. J. CHICAGO LOS ANGELES
Largest Makers of Welding and Cutting Equipment in United States

Digitized by Google

SAND BLAST HELMET

PULMOSAN SAFETY DEVICES

BABBITTING MASK

are in use in many industrial plants throughout the country and are giving entire satisfaction. Pulmosan devices are made of highest quality material, are correct in design and reasonable in price.

RESPIRATORS	BABBITT MASKS
SAND-BLAST-HELMETS	CHIPPING MASKS
DUST-HOODS	WELDING MASKS
ACID MASKS	FURNACE MASKS

WIRE GOGGLES

SPECIAL HELMETS Made to Order

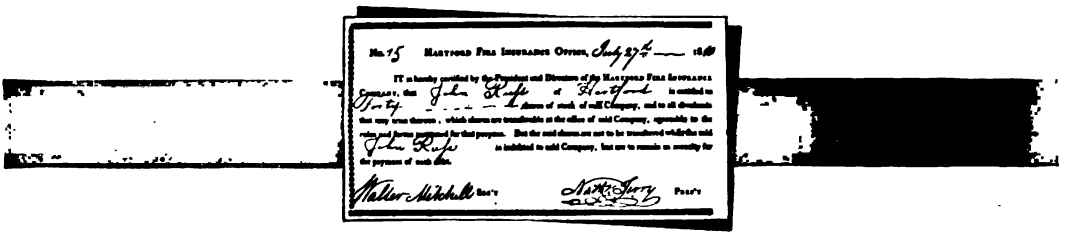
"MODEL C" RESPIRATOR

MULTI-METAL SEPARATING SCREEN CO.

62 East 131st St., New York After December 1st, 247 W. 19th St., New York

Digitized by Google

Family holds Hartford Stock 107 Years



The stock originally issued in 1810 to John Russ, one of the founders of the Hartford Fire Insurance Company, of Hartford, Conn., has never been sold. It has been transferred by inheritance only, and is now held by his direct descendants in the fourth generation. In like manner the Hartford's traditions of financial strength and integrity have been handed down from generation to generation. Frequently the biggest inheritance a father leaves to his son is the right to represent the

INSURANCE *Service* OF THE TWO HARTFORDS

The Hartford Fire Insurance Company and the Hartford Accident and Indemnity Company write practically every form of insurance except life insurance. For over a century Hartford losses have been promptly and fairly paid in ever increasing amounts. Robert Fulton was experimenting with his first steamboat, the *Clermont*, when the Hartford began to write insurance. From that day to this its growth has kept pace with the wonderful development of the country's trade and commerce.

Are you fully insured? Look over the list below and check the forms of insurance which interest you. Ask your agent or broker to get you a Hartford policy, or write to us and we will tell you the name and address of an agent who can give you rates and particulars.

The Hartford Fire Insurance Co.
The Hartford Accident and Indemnity Co.

Hartford Fire Insurance Company, (Service Department F-12) 125 Trumbull Street, Hartford, Conn.

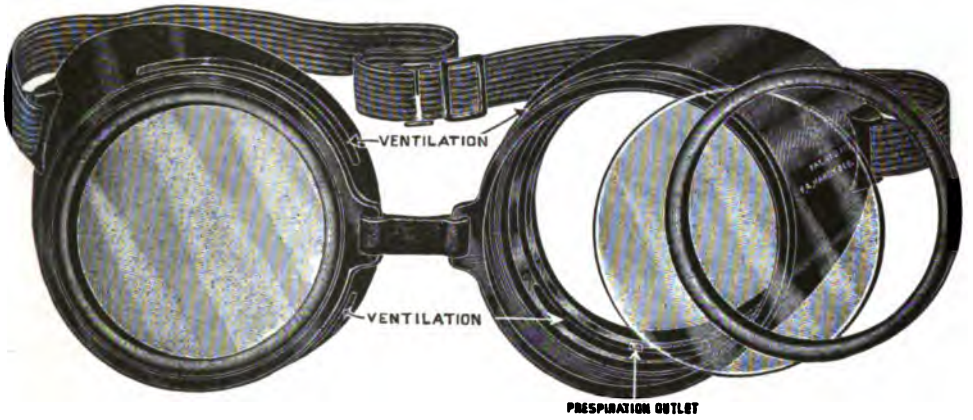
Gentlemen: Please send information on the kind of insurance checked and name of Hartford agent to the name and address written on margin of this coupon.

- ☐ Fire
- ☐ Rent
- ☐ Use and Occupancy
- ☐ Sprinkler Leakage
- ☐ Explosion
- ☐ Tornado
- ☐ Hail
- ☐ Automobile
- ☐ Motor Cycle
- ☐ Tractor
- ☐ Merchandise in Transit
- ☐ Mail Package
- ☐ Registered Mail
- ☐ Samples and Baggage
- ☐ Art Exhibitors
- ☐ Marine Insurance
- ☐ Accident and Health
- ☐ Burglary and Theft
- ☐ Plate Glass
- ☐ Workmen's Compensation
- ☐ Employers' Liability
- ☐ Elevator Liability
- ☐ Teams Liability
- ☐ Doctors' Liability
- ☐ Druggists' Liability
- ☐ Public Liability
- ☐ Landlords' Liability
- ☐ Fidelity and Surety Bonds
- ☐ Golfers'
- ☐ Live Stock
- ☐ Race and Show Horse
- ☐ Dairy Herds

Remember You Saw This in Safety Engineering

Digitized by Google

The Hardy Welding Goggle



Better Eye Protection

FOR

YOUR WELDERS

DURING 1917

AND SUCCEEDING YEARS,
MAY BE HAD WITH THE

HARDY WELDING GOGGLE

WITH NOVIWELD LENSES

The booklet we will gladly send tells why.

F. A. HARDY & COMPANY

JOHN H. HARDIN, Pres.

CHICAGO
10 So. Wabash Ave.

NEW YORK
29 East 22nd St.

DENVER
Gas & Electric Bldg.

DALLAS
Praetorian Bldg.

ATLANTA
Grant Bldg.

SAN FRANCISCO
Phelan Bldg.

Digitized by Google

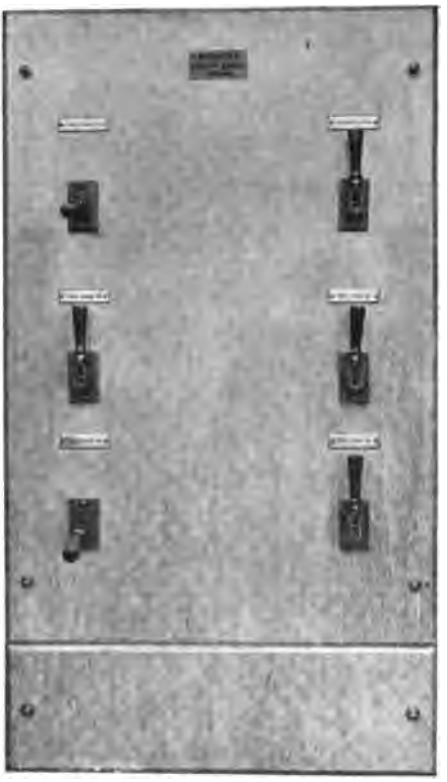
KRANTZ
TRADE MARK.

D. C. OR A. C. AUTO-LOCK SERVICE
TRADE MARK
SWITCH

KRANTZ AUTO-LOCK
TRADE MARK
SAFETY DEVICES

AWARDED **GOLD MEDAL** AT THE
National Exposition of Safety and Sanitation
New York, May, 1916

SAFETY—EVERYWHERE—ALWAYS



AUTO-LOCK SWITCH BOARD WITH DEAD
TRADE MARK
FRONT AND AUTO-LOCK DEVICE IN REAR
TRADE MARK

AUTO-LOCK POWER PANEL
TRADE MARK

Send Us Your Specification — We Will Gladly Submit Figures.

KRANTZ MFG. CO., Inc., 160 7th St., Brooklyn, N. Y.

KRANTZ
TRADE MARK.

Remember You Saw This in Safety Engineering

Digitized by Google

This Roof Is Worthy of Your Recommendation

A roof of Ambler Asbestos Shingles "Century Brand" **can't** take fire; when the side walls are also covered with Ambler Shingles, as in the bungalow illustrated, the building could be held over a blaze and not ignite—for there is nothing to burn.

AMBLER Asbestos Shingles

The Roof That Is As Permanent As The Foundation

Are made of Portland Cement and Asbestos fibre. Their fireproof quality is only one of their features. They are also weather-proof, wind proof and time proof. They practically last forever and never deteriorate in any way, never need painting or repairs of any kind. They are in three natural, non-fading colors: Newport Gray, Indian Red or Blue Black. They are light in weight and can be used to advantage in renewal work.

Details, pictures, prices and samples gladly sent on request.

KEASBEY & MATTISON COMPANY

Dept. E-3, Ambler, Pa. U. S. A.

Manufacturers of

Asbestos Shingles, Building Lumber, Corrugated Sheathing, Pipe and Boiler Coverings

Remember You Saw This in Safety Engineering

Digitized by Google

Pulmotor is again successful

The Edison Weekly

Volume 10 — August 9th, 1916 — Number 32

Pulmotor Saves Life of Four Hour Old Infant

THROUGH the use of one of the Company's pulmotors, operated by Mr M E Gregson of the Distribution Department, the life of a four hour old infant was saved last Thursday

Shortly after nine o'clock in the morning, Dr J Kramer phoned to Mr Lieb's Office asking if a pulmotor could be sent immediately to the Audubon Sanitarium at 8 St Nicholas Place. Both lungs of a tiny boy, only a few hours old, had collapsed, and in the emergency the physician appealed to The New York Edison Company for assistance. Word was sent to Mr Williams of the 3rd District Operating Department, who in turn got in touch with the Distribution Department. Mr Gregson received the call at 9:42 and made a grab for the pulmotor and oxygen tanks and was on his way to the hospital in one of the Company's electric delivery cars. The rate of speed was not equal to the emergency, however, and at 126th Street the Edison man commandeered a passing taxi, and sped uptown at a forty mile clip

Reaching the sanitarium at ten o'clock, Mr Gregson without delay had the pulmotor at work on the almost lifeless form. At 10:50 he discontinued the pulmotor to apply the inhalation apparatus. In half an hour all the oxygen in the first tank was used up, and it was necessary to resort to the hospital tank, keeping the last pulmotor tank in reserve. Up to this time the child had shown practically no sign of life, and the lack of response to the pulmotor was most discouraging. However, by 11:50, after two hours work, the infant became conscious and a moment later began to cry in a decidedly boy-like manner

Type "B" Pulmotor

Safe, simple, efficient, portable and moderately priced—$115. complete. The only hand-operated resuscitation device that is constructed on physiological principles. A layman can use it successfully.

The DRAEGER OXYGEN APPARATUS CO.
418 First Ave. Pittsburgh, Pa.
Makers of Complete Breathing Apparatus
Special Agents for Wolf Safety Lamp Co. of America, Inc.

Remember You Saw This in Safety Engineering

Digitized by Google

Barrett Specification Roofs Guaranteed for 20 Years

We Standardized the Roofs— Now We Standardize the Guarantee!

A DOZEN years ago the introduction of The Barrett Specification standardized roofing practice throughout the country and gave to the old "tar-and-gravel roof" a definite character and reliability.

Local contractors, in the past, have been accustomed to guaranteeing roofs of this type, free of repairs for from five to ten years.

To good reliable roofers such guarantees were no burden because the roof they constructed would last much longer than the guaranteed period. The fly-by-night roofer, however, did a poor and cheap job, gave his guarantee recklessly—and was generally out of business when the roof leaked or trouble came.

As manufacturers of the materials used in Barrett Specification Roofs we, therefore, determined a short time ago to standardize these guarantees and *make them of real value to users of these roofs.*

We, therefore, arranged with the U. S. Fidelity & Guaranty Company to issue a 20-Year Guaranty Bond covering every Barrett Specification Roof of 50 squares and over *wherever our inspection service was available.*

Today this Guarantyand Inspection Service covers all towns of 25,000 population and over and most of the smaller places in the thickly populated parts of the United States and Canada.

This bond takesthe place of short-term guarantees formerly issued by the local roofer and obviously is far better because:

—it is for 20 years (instead of the usual five or ten)

—it is backed by a $15,000,000 Corporation

—it has the further backing of a great Surety Company

—it provides for an *impartial expert inspection of the job.*

To secure the 20-Year Guaranty write your roofing specification as follows:

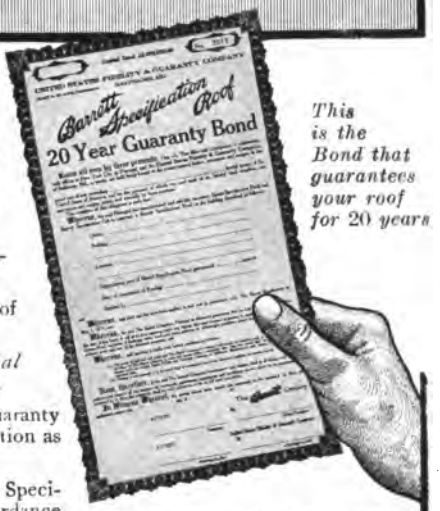
"The roof shall be a Barrett Specification Roof laid in accordance with The Barrett Specification, dated May 1, 1916, by a roofing contractor approved by The Barrett Company. The roofing contractor shall furnish The Barrett Company's Surety Bond Guaranty for twenty years, in accordance with Note 1 of said Specification."

On this solid and honest basis as many contractors as you desire may estimate on the job.

The winning contractor notifies us that he wishes the 20-Year Surety Bond and requests our Inspection Service.

One of our inspectors supervises the construction of the roof, tests it by cutting a cross-section, checks up the quantity and the quality of the materials used and certifies that The Barrett Specification has been strictly followed.

On the basis of the inspector's report the 20-Year Surety Bond is issued by the U. S. Fidelity & Guarantv Company, and the Bond exempts the owner from all expense for repairs or maintenance for the next 20 years.



This is the Bond that guarantees your roof for 20 years

The Guaranty Bond costs you nothing. The service is free *in the interest of good workmanship and the good repute of our materials.*

Barrett Specification Roofs are recognized today as the standard covering for permanent buildings of all kinds. The cost, per year of service, is less than any other roof covering. They take the base rate of insurance and are approved as "Class A" construction by the Underwriters' Laboratories, Inc.

If you are interested we shall be glad to send you further details on request.

The Barrett Company

Largest Manufacturers in the World of Roofing and Roofing Materials

New York Chicago Philadelphia Boston
St. Louis Cleveland Cincinnati Pittsburgh
Detroit Birmingham Kansas City
Minneapolis Nashville Salt Lake City
Seattle Peoria

THE PATERSON MFG. CO., Limited
Montreal Toronto
Winnipeg Vancouver
St. John, N.B. Halifax, N.S.
Sydney, N.S.

Digitized by Google

Prevent a Fly Wheel Explosion in Your Plant

The hazard of an unguarded engine is too great to be overlooked. Fly Wheel explosions are possible in your plant, and have occurred in many plants where engineers were "quite positive their engines could not race."

Our Engine Stops have been in use for over 15 years in leading manufacturing plants throughout the country to safeguard life and property and to prevent shut downs.

Our Engine Stop is installed with a minimum of inconvenience—can be attached to existing throttle valves of any type, make or size without disturbing valve, piping or other parts of the engine.

The reduction in your insurance will pay for our Engine Stop. Write to-day for illustrated booklet and full information.

CONSOLIDATED ENGINE STOP COMPANY, Inc.

Specialists in All Types of Engine Stops and Speed Limit Devices

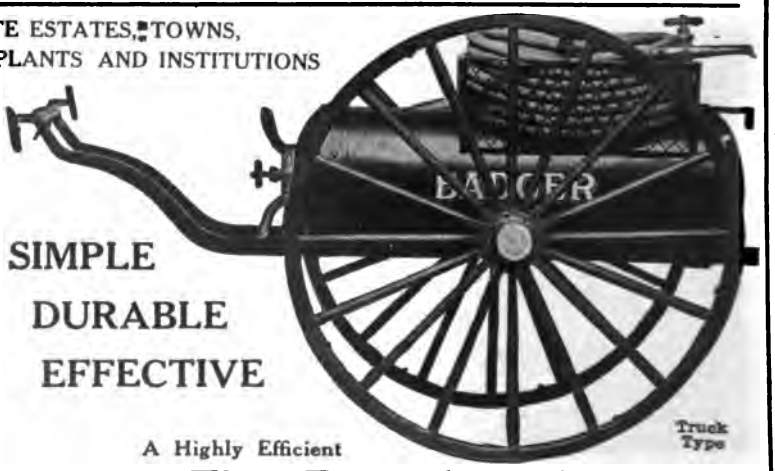
351 WEST 38th STREET, NEW YORK

Badger's Chemical Engines

Examined and tested by Underwriters' Laboratories, Inc., and "APPROVED FOR USE"

FOR PRIVATE ESTATES, TOWNS, MANUFACTURING PLANTS AND INSTITUTIONS

Warehouse Type



Truck Type

SIMPLE
DURABLE
EFFECTIVE

A Highly Efficient

One Man Fire Department

MANUFACTURED BY

BADGER FIRE EXTINGUISHER CO.

New York Office: 123 William Street

32 Portland Street, BOSTON, MASS.

Digitized by Google

Ask "Safety Engineering"

SAFETY ENGINEERING invites questions from its readers, on any problems connected with Safety, Fire Prevention and Welfare Campaigns, with which they are confronted.

Address your inquiry

QUESTION BOX

SAFETY ENGINEERING

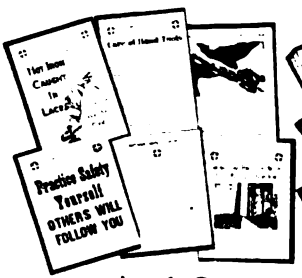
80 MAIDEN LANE **NEW YORK**

Remember You Saw This in Safety Engineering

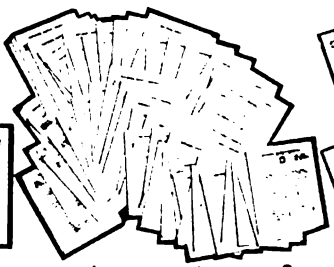
Digitized by Google

NATIONAL SAFETY COUNCIL

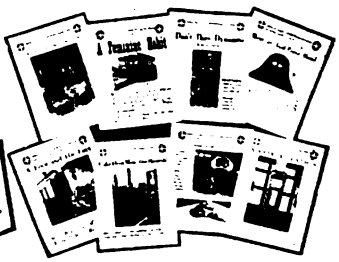
Part of what you get for EACH $5.00 of Dues



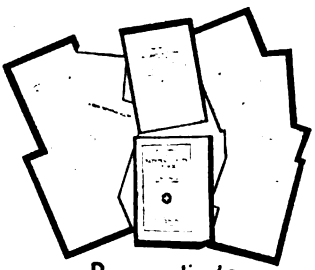
Typical Set of Weekly Bulletins



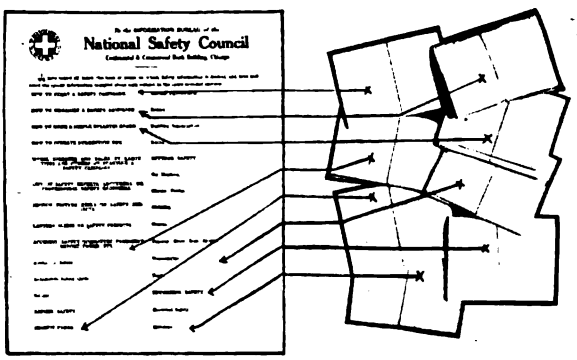
A Year's Issue of Weekly Bulletins

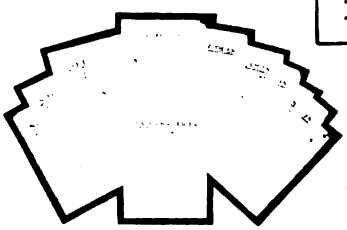


Sample Bulletins 8 Sections

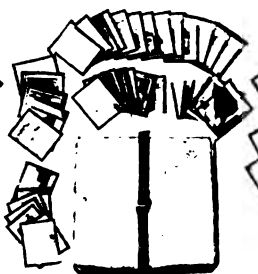


Proceedings Annual Congresses



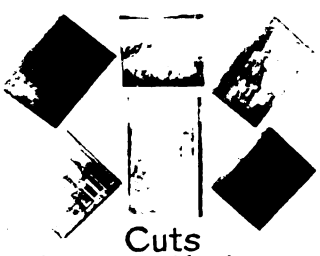


Safe Practices Leaflets



Slides and Films Loaned to Members

Twelve News Letters Per Year



Cuts Loaned to Members

For further information write
Headquarters, 208 S. La Salle St.,
Chicago.

Digitized by Google

"A Manual of Fire Prevention and Fire Protection for Hospitals"

By Otto R. Eichel, M. D., Director, Division of Sanitary Supervisors, New York State Department of Health

This manual provides, in convenient form, an outline of the principles of fire prevention and protection, with indications for their application in institutions housing the sick. It is planned for use not only by superintendents and boards of managers, but also by inspectors, architects, builders and others who have occasion to consider the fire problem in hospitals.

74 pages, 5x7½ Cloth, $1.00 net.

SAFETY ENGINEERING

80 MAIDEN LANE NEW YORK CITY

POROUS HOLLOW CLAY FIRE PROOF BUILDING MATERIALS

ASSURE LOWEST INSURANCE RATE

SEND FOR OUR NEW CATALOGUE. IT TELLS THE REASONS WHY ARCHITECTS AND BUILDERS ENDORSE SUCH MATERIAL.

Manufactured by

HENRY MAURER AND SON

OFFICES

420 East 23rd Street, New York

PENNSYLVANIA BUILDING, PHILADELPHIA

FACTORY, MAURER, N. J.

Remember You Saw This in Safety Engineering

Digitized by Google

SAFETY ENGINEERING

THE SAFETY MAN'S MAGAZINE

Devoted to the Prevention of Fires and Accidents

$3.00
PER YEAR

HEADQUARTERS FOR ELECTRIC & PORTABLE
WATCHMAN'S CLOCKS
E. O. HAUSBURG, 45 MAIDEN LANE, N.Y.
WRITE FOR CATALOGUE AND PRICES

Johns-Manville FIRE Extinguisher
...
Always Ready!
...
SAVES 15% ON AUTO INSURANCE

"STRONG AS THE STRONGEST"

THE NORTHERN ASSURANCE CO.

(LTD. OF LONDON)

ORGANIZED 1836 — ENTERED UNITED STATES 1854

Losses Paid	$102,000,000
Losses Paid in U. S.	36,000,000

Eastern and Southern Departments
55 John Street, New York.

? ? ? **The Question Box**

Ask Safety Engineering

the questions which confront you in your Welfare and Fire and Accident Prevention Work

SAFETY ENGINEERING
80 Maiden Lane, New York

Remember You Saw This in Safety Engineering

Digitized by Google

WANTS —POSITIONS SEEKING MEN —MEN SEEKING POSITIONS

YOUNG MAN, GRADUATE STEVENS INSTITUTE, 7 years' experience; 2½ years in safety engineering work, desires position as safety engineer assistant. At present employed. Address **1807, Safety Engineering.**

AUTOMATIC SPRINKLER ENGINEER — Man with 16 years' experience in selling, designing, and installing heating and sprinkler systems; desires position with either large manufacturing, or contracting company. Is at present engaged. **Address 1815, Safety Engineering.**

James Peters & Son

1934-38 N. Front St., Philadelphia

We manufacture Sliding and Swinging Fire Door hardware for all kinds of Fire Proof Buildings.

Approved by the Underwriters' Laboratories, Inc.

Send for descriptive literature.

BERNARD H. EIDEL
New York Agent

445 Canal St. New York

THE SIGN OF GOOD CASUALTY INSURANCE

Workmen's Compensation, Employers' Liability, General Liability, Owners' Liability, Landlords' Liability, Elevator, Teams, Boiler, Credit, Burglary, Automobile and Personal Accident and Health Insurance.

INSPECTION SERVICE:

The Company inspects the plant and equipment of its policyholders and advises as to the installation of safety devices and as to the elimination of dangerous conditions with a view to prevention of accidents. This service is most thorough and scientific.

Established 1869.

LONDON GUARANTEE & ACCIDENT CO., LTD.

Head Office—CHICAGO, ILL.

Take No Chances With Hopper Cars

The ordinary way of unloading drop-bottom or side dump cars is dangerous for the operator. The workman unloading the car is always exposed to the danger of being caught under the car.

Our Safety Wrench will remove the Hopper Car Hazard. The top pawl is thrown to safety automatically at the instant of lowering the wrench.

Our illustrated circular will explain in detail

The Safety Wrench & Appliance Co., Station O, Baltimore, Md.

SAFETY FIRST

STANDARD, STRIKING, ATTENTION-ARRESTING, ACCIDENT-PREVENTION

SIGNS

BULLETIN BOARDS & TAGS

THE STONEHOUSE STEEL SIGN CO., 17th & Lawrence Sts. Denver, Colo

DANGER

ANY LETTERING CUSTOMERS DESIRE MAY BE PLACED IN THIS BLANK WHITE SPACE!

S

Digitized by Google

Books for the Fire Preventionist

ACCIDENT PREVENTION AND RELIEF.—By F. C. Schwedtman and J. A. Emery.—An investigation of the subject in Europe with special attention to England and Germany, together with recommendations for action in the United States. 481 pages. Illustrations and colored charts.—**Postpaid $5.**

AUTOMATIC SPRINKLER PROTECTION.—By Gorham Dana.—The most complete work on the subject of Automatic Sprinkler Protection ever published. As a text book and reference book it is invaluable to Fire Insurance Managers, Examiners, Special Agents, Local Agents, Inspectors and Engineers, also to Architects, Contractors, Master Mechanics and all those interested in Fire Protection.—**Postpaid $3.**

A SMALLER VOLUME consisting of chapters on Alarm Valves, Dry Valves, Sprinkler Supervisory and Appendix on Sprinkler Heads.—**Postpaid $2.**
FIRST ANNUAL SUPPLEMENT to Automatic Sprinkler Protection and Hand Book of Sprinkler Devices.—**Postpaid 50c.**
SECOND ANNUAL SUPPLEMENT to Automatic Sprinkler Protection and Hand Book of Sprinkler Devices.—**Postpaid 35c.**

FIREMAN CIVIL SERVICE EXAMINATION INSTRUCTION.—Contains 500 questions and answers on Duties, Rules, Fire-Fighting, etc., and answers to previous Examination Questions.—**Postpaid $1.**

CROSBY-FISKE HAND BOOK OF FIRE PROTECTION.—By E. U. Crosby and H. A. Fiske.—Fifth Edition revised, enlarged and brought up-to-date. Standard text book of Fire Protection Engineering.—**Postpaid $4.**

CYCLOPEDIA OF FIRE PREVENTION AND INSURANCE.—The only work of its kind in existence. It covers the cause, prevention and handling of fires; the theory and practice of Fire Insurance; the protection and inspection of risks; the adjustment of Law Suits, and the business operations involved. All matters of inspection, hazards, risks, ratings and schedules are exhaustively treated. Four volumes. Price on Application.

ELEVATORS—HYDRAULIC AND ELECTRIC—A handbook of working rules, formulas, questions and answers, about elevators, for the use of Engineers, Inspectors, Mechanics, Operators and Students.—**Postpaid 50c.**

FIRE DEPT. HYDRAULIC PROBLEMS AND HOW TO WORK THEM.—What the Fireman needs to know about Hydraulics. Underwriters' and Other Tables, Civil Service Examinations and Problems, etc. 21 full page plates.—**Postpaid $2.00.**

FIRE DEPT. MOTOR APPARATUS.—Description and Equipment of every type of Motor Apparatus in use in the New York Fire Dept. Instruction on Operation and Care and other useful information on Fire Fighting Motor Apparatus.—**Postpaid $1.00.**

FIRE DEPARTMENT PROMOTION EXAMINATION INSTRUCTION—For all Ranks in the Uniformed Force and all Bureaus in the Fire Department. 750 questions and answers, and 1000 examination questions, covering examinations in New York, Chicago, San Francisco, Philadelphia, Newark and Jersey City. Official instruction of the New York Fire College and Boston Fire Department.—**Paper $3.00.**

FIRE PREVENTION AND FIRE PROTECTION as applied to Building Construction.—**By J. K. Freitag, B. S., C. E.**—A hand book of theory and practice.—**Postpaid $4.**

FIRES AND FIRE FIGHTERS.—By John Kenlon, Chief N. Y. Fire Dep't.—A history of modern fire fighting, with a review of its development from earliest times.—**Postpaid $2.71.**

INDUSTRIAL ACCIDENT PREVENTION.—By David S. Beyer.—An authoritative and practical treatise on industrial accident prevention, containing over 600 illustrations of typical forms of safety equipment.—**Postpaid $10.00.**

Send Orders to SAFETY ENGINEERING,

Google

and Accident Preventionist

LECTURES ON FIRE INSURANCE.—178 pages. Delivered before the Insurance Institute of Hartford, 1913-14. The lectures follow the topical outline prescribed for the first year course of the three-year course in Fire Insurance outlined in the Educational Courses of the Insurance Institute of America.—**Postpaid 60c.**

LIABILITY AND COMPENSATION LECTURES.—126 pages. Delivered before the Insurance Institute of Hartford, 1913. Thirteen lectures, each of which deals with some particular phase of the subject of Liability and Compensation Insurance.—**Postpaid 60c.**

MANUAL OF ELECTRICITY.—By A. M. Schoen.—A valuable text book for students of electricity. A standard reference book for electrical engineers.—**Postpaid $3.10.**

MANUAL OF FIRE PREVENTION AND FIRE PROTECTION FOR HOSPITALS.—By Otto R. Eichel, M.D.—This manual provides an outline of the principles of fire prevention and protection in institutions housing the sick.—**Cloth $1.00 net.**

MODERN FACTORY.—By George M. Price, M. D.—The only book giving a comprehensive survey of industrial Conditions in factories in the U. S., and an exhaustive treatment of the sanitation, safety, efficiency and welfare work in industrial establishments.—**Postpaid $4.**

NEW BUILDING ESTIMATOR.—By William Arthur.—The acknowledged standard on building costs. Insurance Adjusters and Appraisers, Contractors and Architects throughout the country hold it indispensable.—**Postpaid $3.20.**

NOTES ON HYDRAULICS.—By I. J. Owen, M. E.—A pocket book of useful data for Engineers, Architects, Factory Managers, Fire Insurance Inspectors and Students.—**Postpaid $3.08.**

OCCUPATIONAL DISEASES.—By W. C. Thompson, M. D.—The first exhaustive work covering the entire subject of occupational diseases, their causation, relative importance, frequency of occurrence, pathology, prevention and treatment.—**Postpaid $6.50.**

PRACTICAL SAFETY METHODS AND DEVICES.—By George Alvin Cowee, E. M., S. B.—A new treatise on industrial accident prevention. **440 pages, 127 illustrations. Postpaid $3.00.**

RESUSCITATION.—By C. A. Lauffer, A. M., M. D.—Treats the subject of resuscitation from Electric Shock, Traumatic Shock, Drowning, Asphyxiation from any cause by means of artificial respiration by the prone pressure method.—**Postpaid 50c.**

SAFETY.—By William H. Tolman, Ph. D.—A handbook of practical information on the prevention of accidents. A valuable medium of instruction for all those engaged in industrial accident prevention.—**Postpaid $3.18.**

SAFETY ENGINEERING.—"The Magazine of Safety." Covers the field of conservation of life and property against fire and accident. Monthly, $3 a year. Club subscription rate on application.

SAFETY IN THE FOUNDRY.—Only handbook of the kind published. Result of investigations made by National Founders' Association's Committee on Safety and Sanitation. 187 pages.—**Postpaid $1.50.**

SURE POP AND THE SAFETY SCOUTS.—By R. R. Bailey.—Published under the auspices of the National Safety Council, Chicago. This book introduces the subject of Safety to children through the Safety Scouts. Gives the fundamental principles of safety and suggestions for the organization of safety work in a way that no child can forget or fail to put into practice.—**Postpaid 42c.**

UNIVERSAL SAFETY STANDARDS.—By Carl M. Hansen, M. E.—Published under authorization of the Workmen's Compensation Service Bureau. The only authoritative work yet published on the most approved principles for machine shop and foundry safety. Explains how to safeguard in a manner that will meet with the approval of insurance companies, state officials, and assures a minimum rate for compensation insurance.—**Postpaid $3.16.**

80 Maiden Lane, New York

Digitized by Google

"The Largest Fire Insurance Company in America."

THE HOME
INSURANCE COMPANY
NEW YORK

ELBRIDGE G. SNOW, President

Cash Assets, January, 1916	$37,982,743.93
Reserve as a Conflagration Surplus	*2,000,000.00
Cash Capital	*6,000,000.00
All Other Liabilities	18,446,566.68
Net Surplus	11,536,177.25
Surplus as regards Policy-Holders, January, 1915.	*19,536,177.25

Main Offices, 56 Cedar Street

Marine
Automobile
Windstorm
Parcel Post
Registered Mail
Sprinkler Leakage

FIRE

Tourists' Baggage
Use and Occupancy
Commissions
Profits
Rents
Hail

CONFLAGRATION PROOF

FIRE PREVENTION
SERVICE TO AGENTS AND PROPERTY OWNERS

DEP'T OF IMPROVED RISKS
ENGINEERING AND INSPECTIONS

CONSULTATION AND ADVICE, GRATIS
CORRESPONDENCE SOLICITED

STRENGTH REPUTATION SERVICE

A Poor Guard Is Poor Economy

The only thing that stands between your workmen and your dangerous machinery is your Guard.

How well your employees are guarded depends on how well you have guarded your machinery. A weak guard will protect until at the critical moment, when it will give way under a great strain.

Mundt Perforated Sheets are safeguarding machinery under all conditions because they are made for guarding purposes. They are strongly and carefully made.

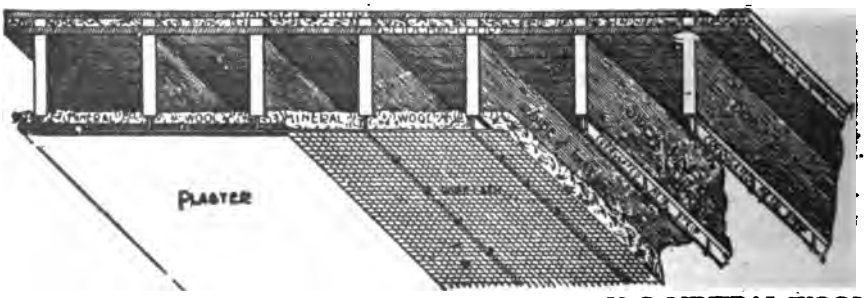
Workmen prefer Mundt Perforated Sheets for guards because they can see the machinery through the perforations. They are easy to clean and there is no danger of fire from dust accumulations.

A sample of our Perforated Sheets will demonstrate their value as guards. Write for sample and prices today.

CHARLES MUNDT & SONS, 64 FAIRMOUNT AVE., JERSEY CITY, N. J.

SEMI-FIRE PROOF CONSTRUCTION FOR CEILINGS, PARTITION

By the use of Mineral Wool applied as shown on cut below.



Samples and Circulars Free.

U. S. MINERAL WOOL CO.,
280 Madison Avenue, New York

Remember You Saw This in Safety Engineering

Digitized by Google

1849 1916

Springfield

Fire and Marine

Insurance Company

SPRINGFIELD, MASSACHUSETTS

LARGEST FIRE INSURANCE COMPANY

CHARTERED BY THE STATE OF MASSACHUSETTS
INCORPORATED 1849 CHARTER PERPETUAL

CASH CAPITAL $2,500,000.00

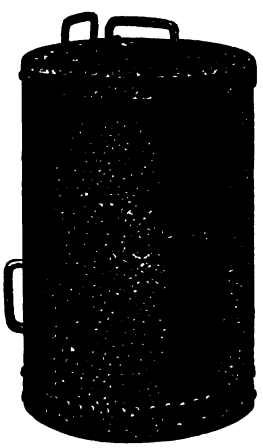
OFFICERS

A. WILLARD DAMON, President
CHARLES E. GALACAR, Vice-President
WILLIAM J. MACKAY, Secretary
PRIOLEAU ELLIS, Ass't Secretary
EDWIN H. HILDRETH, Ass't Secretary
GEORGE G. BULKLEY, Ass't Secretary
FRANCIS H. WILLIAMS, Treasurer

LOSSES PAID SINCE ORGANIZATION.....$58,525,255.78

"KOVEN"

OILY WASTE CAN



positively the best made. Endorsed by Underwriters' Laboratories, Inc., and Associated Factory Mutual Fire Insurance Companies.

These oily waste cans should be in every manufacturing plant in the United States.

L. O. KOVEN & BROTHER

154 Ogden Avenue
Jersey City, N. J.

Remember You Saw This in Safety Engineering

Digitized by Google

GEO. T. McLAUTHLIN CO.

120 FULTON STREET, BOSTON

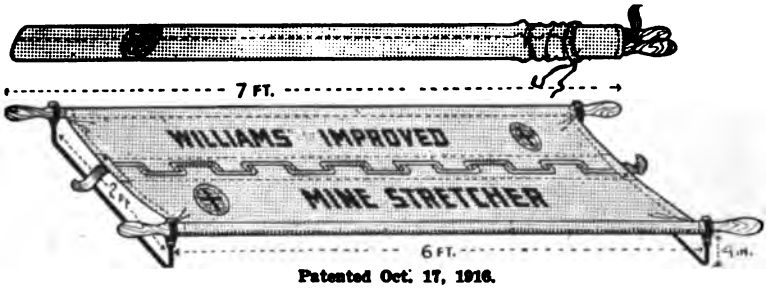
Largest Manufacturers in New England of

FIRE DOORS AND SHUTTERS

Equipped with self-closing device insuring positive closing in case of fire.

APPROVED BY NATIONAL BOARD OF FIRE UNDERWRITERS AND N. E. INSURANCE EXCHANGE.

"NEEDED WHEREVER MEN ARE HURT"



Send for the most instructive stretcher book ever issued.

DO IT NOW — Before the next accident.

Patented Oct. 17, 1916.

WILLIAMS' IMPROVED STRETCHER CO., Wheeling, W. Virginia

"If we had a First Aid Room we might have saved his life."

Why not install an equipment at once? It is an economy to do so. Send for catalogue to

THE KNY-SCHEERER CORPORATION

Manufacturers of First Aid Instruments, Furniture, Sterilizers, Etc.

404-410 West 27th St., New York

Remember You Saw This in Safety Engineering

Digitized by Google

R. D. WOOD & CO.

Engineers
Iron Founders
Machinists
PHILADELPHIA
PA.

MATHEWS'
Single and
Double Valve
FIRE
HYDRANTS
Gate Valves
Valve Indicator
Posts

Manufacturers of All
Kinds and Sizes of
Cast Iron Pipes

This Mask is Specially Designed for Ammonia Plant Engineers, City Firemen,

Manufacturing Chemists, or any one who comes in contact with deadly fumes.

RESPIRATORS

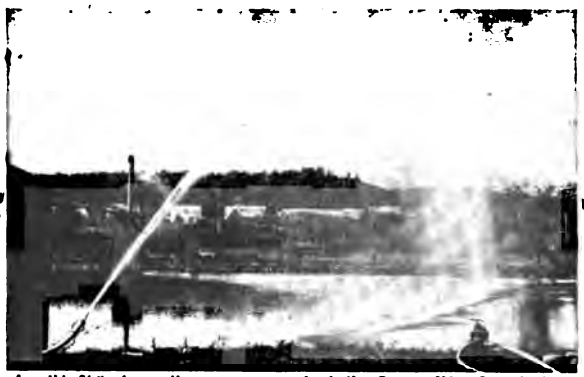
FOR EVERY SERVICE

The most complete line manufactured by any one firm in the United States. Face Masks and Respirators for Ammonia, Smoke, Dust and Chemical fumes.

Prices range from 50c. to $50.00 each.
Send for descriptive price list.

HERBERT GARNETT

Box 247, Central Station, TOLEDO, OHIO
Dept. E.



A solid ¾" stream thrown across pond at the Draper Mfg. Co. plant at Hopedale, Mass. Stream controlled by Eastman Perfection Holder.

SAFETY EFFICIENCY

The Eastman New Nozzle System

Superior streams produced from equipment already installed.
Streams *safely* directed under any pressure by one watchman exactly where required.

Outfits Sent on Trial. Send for Catalogue.

SAMUEL EASTMAN COMPANY

Sole Mfrs. and Patentees

CONCORD - - - - - - - - - N. H.

Digitized by Google

EVERYTHING FOR FIRE PROTECTION

No matter what your needs, and always of the same high standard for which this, the largest Fire Apparatus Plant in the World—that has built 90 per cent. of all heavy fire department apparatus—has been noted during more than 71 years of successful manufacture of fire protection equipment.

Indispensable

for Industrial Plants, Towns, Institutions and Private Estates.

AMERICAN-LAFRANCE

Chemical Fire Engines

Save Water Damage; Take Up Little Space; Always Ready for Immediate Service; Light; Easily Moved; Simple in Design and Operation. Get into Service Quickly and Extinguish Fires with Dispatch.

Send Today for 260-page catalogue of latest and best fire fighting apparatus. Specil catalogues devoted to Municipal Motor Car and Horse-Drawn Fire Department Apparatus.

AMERICAN-LAFRANCE FIRE ENGINE COMPANY, INC.

General Offices: Elmira, N. Y.

Sales Branches

New York—Whitehall Bldg., 17 Battery Place. Chicago—815 South Wabash Ave. Boston—1113 Commonwealth Ave. Portland, Ore.—16th and Marshall Sts. San Francisco—151 New Montgomery St. Atlanta—1633 Chandler Bldg. Dallas—2004 Live Oak St. Denver—304 Jacobson Bldg. Cincinnati—338 W. 4th Ave.

"CHILDS" EXTINGUISHER

APPROVED FEB. 15th, 1902.

THERE ARE OVER 2000 USED BY THE

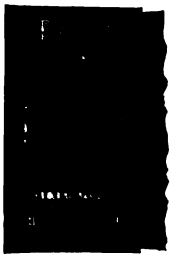
PANAMA CANAL

40 GAL. COPPER TANK CHEMICAL ENGINES FOR HOTELS AND FACTORIES.

CHEMICAL TANKS BUILT SPECIAL FOR FIRE DEPARTMENT APPARATUS.

O. J. CHILDS COMPANY - - UTICA, N. Y.

MANUFACTURERS FIRE APPARATUS



THE E. HOWARD CLOCK CO. Boston, Mass.

The very latest thing in a watchman clock record. Entire record sheet always visible at once. Can be used without change from Saturday to Monday, or over a holiday, and a clear record secured.

Please write any of our offices, Boston, New York or Chicago, for particulars, or address E. A. Bigelow, Treasurer, 373 Washington St., Boston, Mass.

Digitized by Google

NORTON

"Safety as Applied to Grinding Wheels"

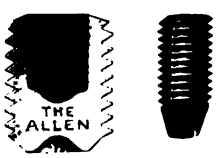
A book illustrating and briefly describing preventive and protective safeguards—modern devices which can be practically applied to the use of grinding wheels and grinding machines. Also, the safety code adopted by the National Machine Tool Builders' Association and grinding wheel manufacturers.

We will gladly send a copy of the book to any one desiring it.

NORTON COMPANY

New York Store: 151 Chambers St. **Worcester, Mass., U. S. A.** **Chicago Store:** 11 N. Jefferson St.

810

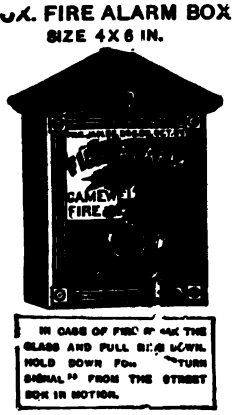


Allen Safety Set Screws

made in any diameter from ¼ to 1½ inches. Any length point or thread. Send for circular No. 22 and free sample screws for testing.

THE ALLEN MFG. CO., 135 Sheldon St., Hartford, Conn.

People's Life Ins. Bldg., Chicago 173 Princess St., Manchester, England


KEYLESS
FIRE ALARM BOX
SIZE 4X6 IN.
IN CASE OF FIRE BREAK THE GLASS AND PULL DOWN LEVER. HOLD DOWN FOR TURN SIGNAL IS FROM THE STREET BOX IN MOTION.

Tho Gamewell Company

Manufacturers and Contractors for Over 57 Years of

Fire Alarms and Police Signal Telegraphs

Complete systems installed for municipal service, controlled by central office apparatus, and operated by storage battery, fitted with all the latest up-to-date appliances.

Our *Auxiliary System* makes it possible to connect interiors of premises *Instantaneously with Fire Department Headquarters*, through the *Public Fire Alarm Apparatus*, by providing any number of interior stations or signal boxes, from which the street alarm box can be operated instantly. Correspondence solicited.

GENERAL OFFICES AND WORKS,
NEWTON UPPER FALLS, MASS.
NEW YORK OFFICE, SUITE 5708, GRAND CENTRAL TERMINAL.

Digitized by Google

On each Sheet

WE STAMP THE BRAND AND THICKNESS

EVANS "ALMETL"

FIRE DOORS (and Shutters)

(Pats. Pend.)

Form impassable Fire Barriers. Constructed of all steel and asbestos, they are rigid, non-warping, and indestructible. No wood to rot, no tin to rust. Fully approved by Underwriters' Laboratories, Chicago, and Factory Mutual Laboratories, Boston.

OTHER FAMOUS FIRE PREVENTION LINES

Fire Retarding "STAR" Ventilators (Pat.)

Made of Galvanized Steel, Galvanized Iron, Sheet Copper. The popularity of this well-known Ventilator is increasing. Over one million now in use Storm-Proof. No Down-Draughts.

MERCHANT'S HIGH-GRADE ROOFING PLATES

Tin roofing of the best quality, and properly laid acts as a definite fire retardant, not only against damage to interior of building from fire in adjoining buildings, but flames arising from interior fire are frequently blanketed and kept from spreading. "Merchant's Old Method" Brand is the best. Open Hearth Copper Bearing Base, very heavy coating, Palm Oil process.

Consult us for Fire Prevention Engineering.

MERCHANT & EVANS CO.

PHILADELPHIA

New York	Cleveland
Baltimore	Chicago
Atlanta	St. Louis
Wheeling	Kansas City

TRADE MARK M & E REG IN U.S. PAT. OFF

FIRE RETARDING
"STAR" VENTILATORS

CROSS SECTION
CORNER FIREDOOR

Remember You Saw This in Safety Engineering

Digitized by Google

Julius King Optical Company

Digitized by Google

Teaching Safety By Motion Pictures

Above picture shows a Safety Meeting of the New York Central Railroad Employes and families, Albany, N. Y.

The Machine Used at This Meeting was a

Power's Cameragraph

This is only one of a great many large employers who use POWER'S CAMERAGRAPH at their Safety Meetings

Nicholas Power Company

Ninety Gold Street New York City

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

THE NEW YORK PUBLIC LIBRARY
REFERENCE DEPARTMENT

This book is under no circumstances to be taken from the Building

JUL 23 191

Digitized by Google

Digitized by Google

Digitized by Google